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The fossil on the front page is *Helicoprion bessonowi* KARPINSKY, 1899.

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442. SOME JURASSIC TRIGONIIDS FROM THE TETORI GROUP IN THE KUZURYU DISTRICT, CENTRAL JAPAN*

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九頭龍地域の手取層群産ジュラ紀三角貝類：九頭龍地域からの三角貝類はこれまで山原坂互層と山原礫岩とから数種が記載されていたが，このたび谷山谷川左岸の山原坂互層中の砂岩から新らたに発見された。これらを検討した結果，5種が識別され，その中，4種 (*Latitrigonia horii*, *L. kasaii*, *Ibotrigonia tetoriensis*, *Vaugonia kuzuryuensis*) は新種で，ここに記載した。

前　田　四　郎

Introduction

The Jurasso-Cretaceous Tetori group is well exposed along the upper tributaries of the Kuzuryu river in Fukui Prefecture (Prov. Echizen). Describing the following four species of trigoniids, KOBAYASHI (1956, 1957) concluded that the Yambarazaka alternation of the district is uppermost Jurassic in age.

Vaugonia yambarensis KOBAYASHI	Yambara conglomerate, base of Itoshiro subgroup.
Latitrigonia tetoriensis KOBAYASHI	Yambarazaka alternation, uppermost Kuzuryu subgroup.
Latitrigonia orbicularis KOBAYASHI	
Myophorella (*Promyophorella*) *orientalis* KOBAYASHI and TAMURA	

Lately the writer made a collection of trigoniids from the Yambarazaka alternation at the east end of Goribashiri on the Taniyamadani (谷山谷), a tributary of the Kuzuryu (九頭龍) river.

Because the alternation yielding *Kranaosphinctes matsushimai*, *Peltoceratoides* sp. and *Ptychophylloceras* sp. is middle Oxfordian, all of the trigoniids below listed are Oxfordian.

Latitrigonia horii MAEDA, new species

Latitrigonia kasaii MAEDA, new species

Ibotrigonia tetoriensis MAEDA, new species

Vaugonia kuzuryuensis MAEDA, new species

Myophorella (*Promyophorella*) *orientalis* KOBAYASHI and TAMURA

Here the writer expresses his sincere thanks to Prof. T. KOBAYASHI of the University of Tokyo for his kind advices, to Dr. M. TAMURA of the Kumamoto University and Dr. I. HAYAMI of the Kyushu University for the suggestion, and also to Messrs T. KAWABE, S. KAWAMATA, I. SUZUKI, A. OURA and S. SASAZUKA for assistance in fossil collection.

Stratigraphical notes

The group in this district can be classified, in descending order, into the following formations:

* Received Jan. 17, 1962; read at the Annual Meeting of the Society at Sendai, Jan. 20, 1962.

Akaiwa subgroup	Kitadani alternation (about 100 m thick) [P]
	Akaiwa sandstone (about 500 m thick) [P, W]
Itoshiro subgroup	Itsuki alternation (150—250 m thick) [O, C, W]
	Ofuchi conglomerate (about 150 m thick)
	Ashidani alternation (about 80 m thick) [P, O]
	Yambara conglomerate (50—53 m thick) [T]
	Umagadani unconformity
Kuzuryu subgroup	Yambarazaka alternation (43—120 m thick) [A, B, T]
	Kaizara black shale (195—500 m thick) [A, B, P]
	Tochimochiyama sandstone (200—1800 m thick) [B]
	Oidani alternation (200—600 m thick) [P, B]
	Shimoyama conglomerate (30—200 m thick)

P: Plant, C: *Corbicula*, A: Ammonite, T: Trigoniid, W: Silicified wood, O: *Ostrea*, B: Belemnite

The Shimoyama conglomerate containing subangulated pebbles of gneiss, granite, sandstone, slate, cherty rock, limestone and so forth is well exposed at Shimoyama, Ono and Asahi.

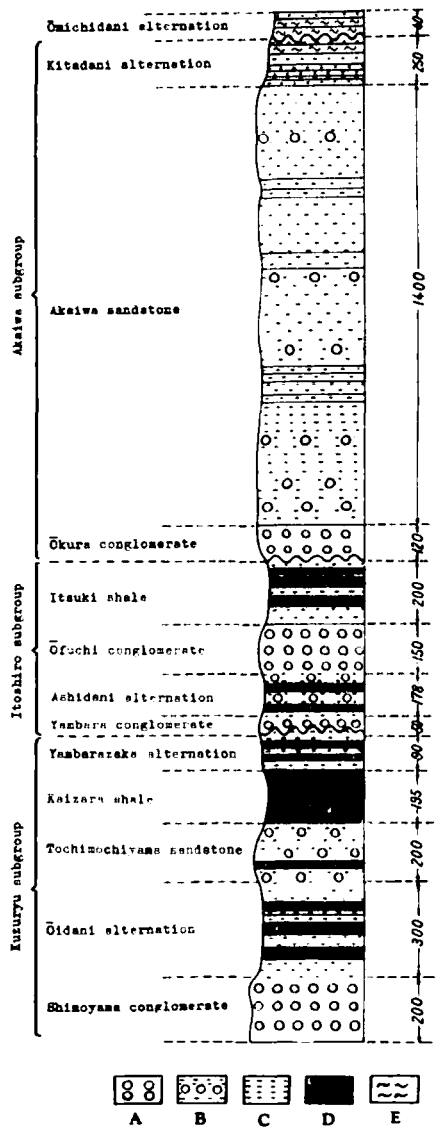
The Tochimochiyama sandstone, Kaizara black shale, Yambarazaka alternation and some parts of the Oidani alternation and Yambara conglomerate exposed at Shimoyama, Nakatatsu and Kaizara are marine sediments, while the others are brackish or lacustrine deposits.

According to SATO (1960) the Kaizara black shale is divisible into three ammonite zones in descending order as follows:

3) *Oppelia* zone: *Camphylites* aff. *delmontanus* (OPPEL), *Oecotraustes* sp., *Oppelia* aff. *subradiata* SOW., *Oxycerites* sp., *Bomburites* aff. *globuliformis* (GEMMELLARO).

2) *Grossouvreia* zone: *Grossouvreia* cf. *subtilis* (NEUM.), *G. laeviradiate* SATO, *G.* sp., *Kepplerites* (*Seymourites*) *japonicus* KOBAYASHI, *K.* (*S.*) *acuticostum* KOBAYASHI, *K.* (*S.*) *kuzuryuensis* KOBAYASHI, *Lilloetia* sp.

1) *Neuqueniceras* zone: *Neuqueniceras yoko-*



Text-fig. 1. Schematic Columnar Section of the Tetori Group.

A. conglomerate; B. conglomeratic sandstone; C. sandstone; D. shale; E. tuffaceous rook.

yamai (KOBAYASHI and FUKADA), *N. yokoyamai* var. *alticostatum* SATO, *N. maedai* SATO, *Calliphylloceras* sp., *Holcophylloceras* sp.

The ammonites show the Callovian age of the Kaizara black shale. Though the shale is extensive from Kaizara to Ono, no occurrence of trigoniids has hitherto been known in it.

The Yambarazaka alternation consists of conglomeratic coarse-grained sandstone and micaceous sandy shale, presumably indicating a regression of the Tetori sea. The Yambara conglomerate which is typically developed at Yambara along the Itoshiro river, lies unconformably on the Yambarazaka alternation and contains boulders of gneiss, granitic rock, quartz-porphyry, sandstone, slate, limestone and so forth. It is remarkable that the sandstone boulders derived from the Kuzuryu subgroup are abundant. The Ashidani alteration well exposed along the Itoshiro river, consists of alternation of fine- to coarse-grained sandstone and micaceous sandy shale and contains *Ostrea* sp. at some horizons. The Itsuki alternation consists of fine- to coarse-grained sandstones and mica-bearing black shale, and yields *Ostrea* sp., *Corbicula* (*Mesocorbicula*) *tetoriensis* KOBAYASHI and SUZUKI and other non-marine molluscs and fossil plants such as *Onychiopsis elongata* (GEYLER), *Cladophlebis denticulata* (BRONGNIART), *C. exiliformis* OISHI, *Xenoxylon latiporosum* (CRAMER) and so on. The Akaiwa sandstone in this district consists mainly of arkosic coarse-grained massive sandstone. Several plant fossils occur at some horizons, but no molluscan fossil has hitherto been found. The Kitadani alternation is characterized by the presence of reddish or greenish tuffaceous rock facies and yields *Onychiopsis elongata* (GEYLER), *Cladophlebis denticulata* (BRONGNIART), *C. exiliformis* OISHI, *Nilssonia orientalis* HEER, *Podozamites lanceolatus* (LINDLEY and HUTTON), *P. Reinii* GEYLER and so forth. The alternation is early Cretaceous in age.

Description of Species

Subfamily Trigoniinae
LAMARCK, 1819

Genus *Latitrigonia* KOBAYASHI, 1957

Latitrigonia horii MAEDA, n. sp.

Pl. 1, figs. 1-6.

Description:—Shell subquadrate, well convex, convexity attaining the maximum on marginal carina at about one-third below umbo and nearly as long as high; marginal carina diagonal; test thick. Umbo located at one-fourth or one-fifth from front; anterior margin rounded; ventral broadly arched; siphonal arcuated; anterior and ventral margins disposed with an angle of about 100 degrees between them; hinge typical of Trigoniae; escutcheon carina somewhat distinct; marginal carina more or less sharp, nearly straight and largely tuberculated; area extraordinarily large, divided by a finely tuberculated median carina, growth lines fine and transversal; ante-carinal sulcus wide and shallow; disk ornamented with about 8 concentric costae which are parallel to ventral margin and thickened into a large node at the posterior end.

Measurement (*in mm*):—

Rg. Number	Valve	Length	Height	Width
R. 61121501 (Holotype)	Right	35	22	5
R. 61121502	Left	36	22+	5
R. 61121503	Left	30+	24+	5

Comparison:—This species most closely resembles *L. unituberculata* (KOBAYASHI and TAMURA, 1957) from the Bathonian—Callovian Yamagami formation (4th Trigonian zone) of Soma (TAMURA, 1960), but it is easily distinguishable from the latter by having anteriorly situated umbo and less concentric costae on disk and being much longer in outline of the shell. The present specimens are also related to *L. orbicularis* described by KOBAYASHI in 1957 from the same Yambarazaka alternation, but they differ from each other in featuers of the posterior end of costae on the disk and shell-outline. The specific name is dedicated to Mr. Yoshitaka HORI of the Fukui Natural History Museum, who kindly helped the writer in the study of the Tetori group.

Occurrence:—Rare in sandstone of the Yambarazaka alternation at the left bank of the Taniyamadani river and the east of Goribashiri, Izumi village, Ono county, Fukui Prefecture.

Latitrigonia kasaii MAEDA, n. sp.

Pl. 1, fig. 7.

Description:—Shell subtrapezoidal, about 1.6 times as long as high, gently convex, convexity attaining the maximum on the marginal carina at about two-thirds the shell height; umbo sharp, located about one-third from front; anterior margin well rounded; ventral broadly arched; siphonal slightly arcuate; test thick; hinge typical of Trigoniae. Escutcheon carina distinct, sharply and finely tuberculated; marginal carina straightened, somewhat sharp, and tuberculated postero-ventrally; escutcheon narrow and provided with several concentric costellae near umbo; area divided by tuberculated median carina and with fine lines; ante-carinal sulcus distinct and shallow; disk ornamented with concentric costae which are narrower than interspace, counted about 10, and thickened into a large node at the posterior end; concentric fine lines seen in interspaces.

Measurement (in mm):—

Rg. Number	Valve	Length	Height	Width
R. 61121511 (Holotype)	Left	about 30	20	5

Observation:—Among several deformed specimens, the holotype is best preserved, although it is slightly broken in posterior. The posterior gaping is presumable from growth-line.

Comparison:—This species resembles *L. unituberculata* (KOBAYASHI and TAMURA, 1957) closely in the shell outline and costation, but differs from the latter in the strong and tuberculate marginal carina, narrower area and stronger costae. *L. unicarinata* (KOBAYASHI and TAMURA, 1957) from the Bathonian—Callovian of Soma district in North Japan has a somewhat similar outline of the shell. But it is very different from the new species in the more densely spaced costae on the disk. The specific name is dedicated to Mr. Keisuke KASAI who was a teacher of the Yamanashi normal school.

Occurrence:—Very rare in a sandstone of the Yambarazaka alternation, the Kuzuryu subgroup, at Taniyamadani, Izumi village, Ono county, Fukui Prefecture.

Genus *Ibotrigonia* KOBAYASHI, 1957

Ibotrigonia tetoriensis MAEDA, n. sp.

Pl. 1, figs. 8-9.

Description:—Shell small, subquadrate, nearly as long as high, gently convex, convexity attaining the maximum on marginal carina at about one-third from umbo; test thick. Umbo somewhat small, located at one-third from front; beak opisthogyrous; anterior margin gently rounded, joining ventral margin with an angle of about 110 degrees which the latter is broadly arched; siphonal margin well rounded; post-umbonal margin nearly straight; hinge typical of Trigoniae. Escutcheon carina distinct and tuberculated; marginal carina arcuated, sharp and tuberculated; escutcseon narrow; area fairly large, divided by a finely tuberculated median carina and smooth; ante-carinal sulcus narrow and shallow; disk ornamented with about 10 concentric costae which are parallel to ventral margin, broken into tubercles on the posterial side and thickened into a large node at the posterior end.

Measurement (in mm):—

Rg. Number	Valve	Length	Height	Width
R. 61121512 (Holotype)	Left	24	20	5
R. 61121516	Right	23+	18+	5

Comparison:—This species fairly resembles *Ibotrigonia masatanii* KOBAYASHI and TAMURA (1957) from the Yamagami formation (4th Trigonian zone of Soma), Bathonian—Callovian, in the Soma district, North Japan, but it is easily distinguishable from the latter by the ornament and shell outline.

I. masatanii var. from the Yamagami formation (KOBAYASHI and TAMURA, 1957) resembles this species in ornamentation on the disk, but in this species the shell outline is subquadrate and costae on the disk are mostly broken into tubercles on the posterial side.

Occurrence:—Rare in sandstone of the Yambarazaka alternation, the Kuzuryu subgroup, at Taniyamadani, Izumi village, Ono county, Fukui Prefecture.

Subfamily Vaugoniinae KOBAYASHI, 1954

Genus *Vaugonia* CRICKMAY, 1930

Vaugonia kuzuryuensis MAEDA, n. sp.

Pl. 1, fig. 10.

Description:—Shell small, gently convex; convexity attaining the maximum on the disk at about one-third height below from umbo; test thick. Umbo a little large, located submedially; anterior margin gently rounded; siphonal well rounded; hinge typical of Trigoniae. Escutcheon carina distinct and scarcely pitted; marginal carina distinct, gently arcuated, pitted and becomes somewhat obtuse postero-ventrally; area divided by a finely tuberculated median carina and provided with fine growth lines and several costellae near the umbo; ante-carinal sulcus wide and fairly shallow; disk ornamented with about 8 costae; umbonal three of them gently arcuated; others form Vs at about median portion on disk; accordingly umbonal ones form an obtuse angle with marginal carina but become acute ventrally.

Measurement (in mm):—

Rg. Number	Valve	Length	Height	Width
R. 61121513 (Holotype)	Right	28	19+	8

Comparison:—Represented by one external mould with the damaged ventral portion of a right valve. The costae on

the disk are not tuberculated. *Vaugonia niranohamensis* (KOBAYASHI and MORI, 1955) from the Lower Jurassic in Miyagi Prefecture fairly resembles it in general characters, especially in ornamentation on the disk, but in this species the shell-size is much larger and costae on the disk are stronger. Ante-carinal sulcus in the shell is distinct, but in *niranohamensis* it is indistinct.

Though *V. yokoyamai* described in 1955 by KOBAYASHI and MORI from the Niranohama sandstone in Miyagi Prefecture shows some resemblance to this species in shell outline, it differs from that species in costae on the disk.

Occurrence:—Very rare in sandstone of the Yambarazaka alternation, the Kuzuryu subgroup, at Taniyamadani, Izumi village, Ono county, Fukui Prefecture.

Subfamily Myophorellinae KOBAYASHI, 1954

Genus *Myophorella* BAYLE, 1878

Myophorella (*Promyophorella*) *orientalis* KOBAYASHI and TAMURA

Pl. 1, figs. 11-12.

1955. *Myophorella* (*Promyophorella*) *orientalis* KOBAYASHI and TAMURA, *Japan. Jour. Geol. Geogr., Vol. 26, Nos. 1-2*, p. 98, pl. 5, figs. 6a-b.

1957. *Myophorella* (*Promyophorella*) *orientalis* KOBAYASHI, *Japan. Jour. Geol. Geogr., Vol. 28, Nos. 1-3*, p. 46, pl. 1, figs. 16-18.

Represented by several imperfect external moulds. Shell medium in size; marginal carina distinct and tubercul-

Explanation of Plate 1

Latitrigonia horii MAEDA, n. sp. ..... p. 3
Fig. 1. Clay cast of right valve, holotype (R. 61121501) ×1
Fig. 2. Internal mould of holotype ×1
Fig. 3. Posterior view of a clay cast of holotype ×1.3
Fig. 4. Clay cast of imperfect left valve, paratype (R. 61121502)
Fig. 5. Posterior view of a clay cast of imperfect left valve, paratype (R. 61121503) ×1.3
Fig. 6. Imperfect left valve, paratype (R. 61121504) ×1
Latitrigonia kasaii MAEDA, n. sp. ..... p. 4
Fig. 7. Modeling cast of left valve, holotype (R. 61121511) ×1.5
Ibotrigonia tetoriensis MAEDA, n. sp. ..... p. 4
Fig. 8. Modeling cast of left valve, holotype (R. 61121512)
Fig. 9. Posterior view of a modeling cast of holotope ×1.7
Vaugonia kuzuryuensis MAEDA, n. sp. ..... p. 5
Fig. 10. Clay cast of right valve, holotype (R. 61121513) ×1.5
Myophorella (*Promyophorella*) *orientalis* KOBAYASHI and TAMURA ..... p. 6
Fig. 11. Clay cast of imperfect left valve (R. 61121514) ×1.4
Fig. 12. Clay cast of imperfect left valve (R. 61121515) ×1.4

All of the illustrated specimens are kept in the Institute of Geology, College of Arts and Sciences, Chiba University, Chiba. Loc: Yambarazaka alternation of sandstone and shale in the Kuzyuryu subgroup, the lower division of the Tetori group, in Izumi village (和泉村), Ono county (大野郡), Fukui Prefecture (福井県).

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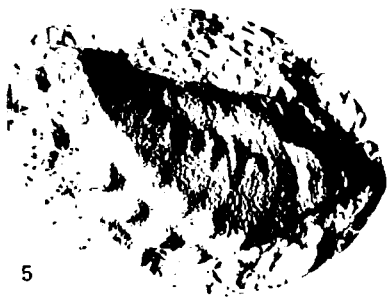

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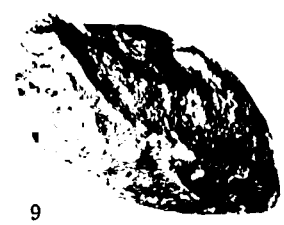

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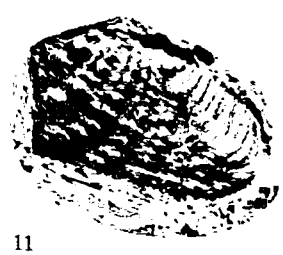

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ated. Area with numerous, somewhat coarse and sharp costellae of which about 4 or 5 are in 5 mm. Disk ornamented with arcuate costae which form an acute angle with the marginal carina. The costation is similar to that of KOBAYASHI and TAMURA's form (1955) from compact sandstone (9th Trigonian zone) of the Koyamada formation at Umazawa, Koyamada, Kamimano village, Fukushima Prefecture. Therefore the present specimens are identified with *orientalis*.

Occurrence:—Rare in sandstone of the Yambarazaka alternation, the Kuzuryu subgroup, at Taniyamadani and east of Goribashiri, Izumi village, Ono county, Fukui Prefecture.

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Trans. Proc. Palaeont. Soc. Japan, N.S., No. 49, p. 8, Apr. 10, 1963

SHORT NOTE

10. *LILLOETIA* SP. (AMMONITE CALLOVIENNE) DE MITAŔASI AU BASSIN DE TETORI*

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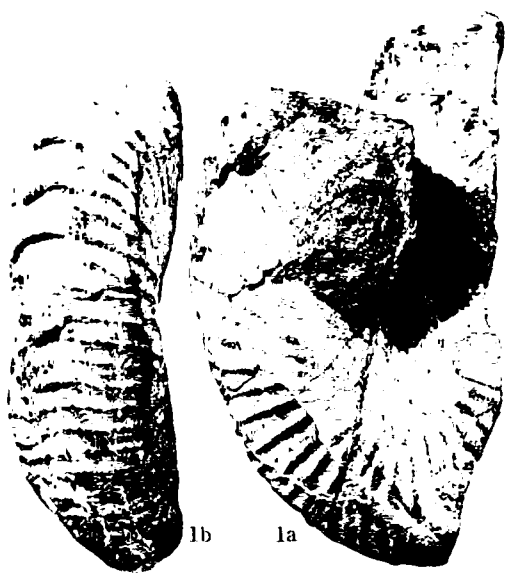
Un spécimen d'Ammonite fragmentaire mais non usé, du diamètre d'environs 50 mm, se provient de Mitarashi dans la région de Shiokawa.

Il s'agit d'une espèce proche de *Lilloetia buckmani* (CRICKMAY), représentée par un tour qui montre les caractéristiques suivants : enroulement très involute, ombilic très étroit et profond avec le bord peu accusé et doucement convexe, et costulation flexueuse dans l'ensemble à côtes primaires atténuées sur la partie interne des flancs et à secondaires plus nombreuses et plus élevées prenant naissance par la bifurcation irrégulière des côtes primaires sur le tier interne des flancs.

Le genre *Lilloetia*, exclusivement nord-pacifique, n'existe que dans le Callovien, en particulier aux zones à *Kepplerites tychois* et *K. mclearni* de l'Alaska et de la Colombie britanique. Ces zones correspondraient aux zones à *calloviense* et à *jason* de l'échelle européene.

L'existence d'un niveau callovien inférieur est donc approuvée dans la région de Shiokawa, au contraire à la notice de MAEDA (1952) qui n'admet qu'un seul niveau oxfordien marin pour la region. IWAYA (1940) a signalé, d'ailleurs, deux horizons marins dans la même région et son M8 (M1 d'après MAEDA) correspond au niveau du présent spécimen.

* Received Apr. 19, 1962.



Text-fig. 1. *Lilloetia* sp.

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Trans. Proc. Palaeont. Soc. Japan, N. S., No. 49, pp. 9-14, pl. 2, Apr. 10, 1963

443. ADDITIONAL NOTES ON LATE PALAEOZOIC CORALS FOUND IN THE SOUTHERN PART OF THE TAMBA DISTRICT*

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and

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丹波地帯南部の後期古生代のさんごの追加：先に発表したものの他の四射さんご4種を記載した。その内2種は新種である。　坂口重雄・山際延夫

The writers previously studied the late Palaeozoic corals found in the southern part of the Tamba District and resulted in describing twelve species in six genera of the Rugosa (SAKAGUCHI, S. and YAMAGIWA, N., 1958). Later, they have obtained several new specimens of the rugose coral during their field survey of the same district. Besides these materials, they have been permitted to study some specimens of coral in the collection of the Geological Institute of the Kyoto University and in SHIMIZU's possession. In this article is given the result of the study on the materials mentioned above.

Faunal evidences indicate the upper palaeozoic rocks of the district to be of middle to lower Permian age, but there are very thick non-fossiliferous strata above and below the fossiliferous ones. It is, however, thought that the overlying strata indicate an upper Permian age and the underlying ones, at least its lower part, extend into the Carboniferous. The fauna of this district is characterized by a rather abundant fusulinids as well as a considerable amount of corals.

The stratigraphical sequence and the faunal zonation have been already reported in detail by one of the writers (SAKAGUCHI, S., 1961).

The zonal subdivision of this district based on fusulinids is quoted here, together with accompanying corals of each zone :—

IV	*Yabeina* zone	6. *Waagenophyllum indicum* subzone
III	*Neoschwagerina* zone	5. *Neoschwagerina craticulifera* subzone
II	*Parafusulina* zone	4. *Parafusulina kuramensis* subzone
		3. *Misellina* sp. subzone
I	*Pseudoschwagerina* zone	2. *Pseudofusulina vulgaris* subzone
		1. *Triticites montiparus* subzone

The *Triticites montiparus* subzone marks the lowest fossil horizon of this district and includes such as *Clisiophyllum awa* (MINATO), *Dibunophyllum? omorii* SAKAGUCHI and YAMAGIWA, *Stylidophyllum* sp. indet. (*S. kinkiense* SAKAGUCHI and YAMAGIWA, n. sp.), and *Heritschioides*

* Received Apr. 23, 1962; read at the 80th Meeting of the Palaeontological Society of Japan, November 18, 1961, at Fukuoka.

sp. indet. As discussed in the previous paper, the former two species are of Carboniferous type of the rugose coral but are found in strata referred to the *Triticites montiparus* subzone. The *Pseudofusulina vulgaris* subzone contains a considerable amount of corals together with leading forms of fusulinid of the subzone. As for corals of this subzone, they include *Heritschioides ojensis* SAKAGUCHI and YAMAGIWA, *Heritschioides ozakii* SAKAGUCHI and YAMAGIWA, *Heritschioides*? sp. indet., *Polythecalis*? *meandroides* SAKAGUCHI and YAMAGIWA, *Stylidophyllum kameokense* SAKAGUCHI and YAMAGIWA, and *Stylidophyllum quadratum* SAKAGUCHI and YAMAGIWA. None of coral is reported from the *Parafusulina kuramensis* subzone but a coral, genus and species indetermined, is found in the *Misellina* sp. subzone. The *Neoschwagerina craticulifera* subzone yields *Huangia izuruhensis* (SAKAGUCHI and YAMAGIWA) and *Huangia*? sp. indet. The *Waagenophyllum indicum* subzone includes a typical form of *Waagenophyllum indicum* (WAAGEN and WENTZEL). *Waagenophyllum tambense* SAKAGUCHI and YAMAGIWA, n. sp., is found in a limestone immediate below this subzone. There is another rugose coral, *Huangia* sp. indet., which was found by the late Shintaro NAKAMURA of the Kyoto University in the Western Hills of Kyoto, but unknown to what horizon to belong.

The writers wish to express their hearty thanks to the following gentlemen; to Professor Susumu MATSUSHITA of the Kyoto University of Kyoto, who permitted them to study the materials in his institute, and also to Mr. Teruo SHIMIZU, the president of the Nippon Chikagakusha of Kyoto, for his kind offer of corals in his collection.

Description of Coral Species

Genus *Stylidophyllum* FROMENTAL, 1861

Stylidophyllum kinkiense SAKAGUCHI and YAMAGIWA n. sp.

Pl. 2, figs. 1a, 1b, 2.

Corallum compound, massive; composed of prismatic corallites, polygonal, usually five-sided in transverse section. Corallite usually 7-9 mm in diameter of transverse section in mature stage. External wall thick and prominent, bearing coarse denticles on all sides, which correspond to septa in number. Axial structure less than 2 mm in diameter; composed of a few septal lamellae and axial tabellae. Median plate relatively distinct. Septa of two orders, major and minor alternating. Major ones moderately thick, 17 to 22 in number and almost reach axial structure; counter septum connecting with median plate. Minor ones thinner, usually one-half to two-thirds length of major. Septa slightly sinuous, thick in medial area, being gradually thinner towards axis, and most of them disappearing into meshes of vesicles towards periphery, but some connecting with denticles of external wall. Dissepiments arranged in lonsdaleoid pattern showing rather regular cysts, all convex towards axis.

In longitudinal section, tabularium almost occupied by axial structure, but sometimes short horizontal tabulae observed. Tabellae more steeply ascending to axis. Dissepiments relatively long, slightly curved, their convex sides facing inwards and upwards.

Comparison:—This species has been reported as *Stylidophyllum* sp. indet. in the previous paper (SAKAGUCHI and YA-

MAGIWA, 1958, pp. 174, 175, pl. 4, figs. 5a, 5b), based on a single specimen. Recently, more numerous specimens have been obtained, so a new specific name is proposed in this paper.

The general structure of this species shows close relationship to OZAWA's *Lonsdaleia floriformis crassiconus* McCOY (OZAWA, 1925, p. 69, pl. 8, fig. 1) from the Akiyoshi Limestones of Nagato, Japan. Since no longitudinal section is illustrated in his paper, these two species can not be compared in detail. It differs from *Stylidophyllum floriformis crassiconus* (McCOY) (SMITH, 1915, pp. 20, figs. 3-10) of England in having no distinct tabula in the longitudinal section and more loose axial structure in the transverse section. This species closely resembles *Stylidophyllum floriformis floriformis* (em. MARTIN) (SMITH, 1915, pp. 247-251, pl. 19, figs. 1-5) from the Lower Carboniferous of England in the general structure of the transverse section. These two species, however, can be distinguishable in the following respect; the former has no distinct tabula in the longitudinal section but the latter has distinct long horizontal ones. Finally, it can be differentiated from *Stylidophyllum yokoyamai* (OZAWA 1925, p. 112, pl. 8, figs. 5, 6; MINATO, 1955, p. 134, pl. 41, fig. 2; pl. 43, fig. 5) from Nagato, Japan by its marked development of the lonsdaleoid dissepiments in the transverse section.

Locality and Horizon:—Specimens were collected by Teruo SHIMIZU from the Kannontoge Limestone referred to the *Triticites montiparus* subzone in the Sonobe Formation, Sonobe-cho, Funai-gun, Kyoto Prefecture. Lower Permian.

Repository:—Deposited in Geological Institute, Osaka Gakugei University. Reg. nos. IGOG 62002a (holotype), 62002b (holotype), 62004.

Genus *Waagenophyllum* HAYASAKA, 1924

Waagenophyllum tambense SAKAGUCHI and YAMAGIWA, n. sp.

Pl. 2, figs. 3a, 3b.

Corallum fasciculate, composed of cylindrical corallites. Corallites usually 4 to 7 mm in diameter in transverse section. External wall relatively thin. Septa of two orders, major and minor in alternation. Sometimes tertiary septa present. Numbering 22 to 28 for major septa and as many for minor ones, both being more or less sinuous. Major septa very thick at proximal ends and thin distally, mostly reaching near axial structure. Minor ones usually half to two-thirds length of major and relatively thinner. Dissepiments mostly arranged concentrically. Axial structure small in size, with a width of about one-fourth to one-sixth diameter of corallites, composed of axial tabellae and septal lamellae. Median plate relatively distinct.

In longitudinal section, tabularium entirely occupied by axial structure; tabula absent. External part of dissepimentarium composed of small vesicles, facing upwards and inwards. Internal part of dissepimentarium composed of elongate, slightly curved vesicles facing inwards or inwards as well as upwards. Axial structure composed of steeply ascending tabellae and a distinct median plate. Tabularium about one-fourth width of corallites.

Comparison:—This new species is closely related to *Waagenophyllum akasakensis* (YABE, 1909, p. 4, text-fig. 1; YABE and HAYASAKA, 1915, p. 100; OZAWA, 1925, p. 75, pl. 14, figs. 5, 6; SMITH, 1935, p. 36; MINATO, 1955, pp. 104, 105, pl. 37, figs. 6, 7) described from the Middle

Permian at many places of Japan in size of corallites and number of septa. It differs, however, from the latter in having shorter minor septa, tertiary septa and no tabula in longitudinal section. It closely resembles *Waagenophyllum indicum* (WAAGEN and WENTZEL, 1866, pp. 897-900, pl. CI, figs. 1-3, pl. CXV, figs. 3, 4; YABE and HAYASAKA, 1915, pp. 97, 98; SMITH, 1935, p. 32, pl. 8, figs. 1-6; MINATO, 1943, pp. 52-54, pl. 1, figs. 1-4; MINATO, 1955, pp. 102, 103, pl. 21, figs. 1, 2; pl. 26, figs. 2, 4-6, 8; SAKAGUCHI and YAMAGIWA, 1958, pp. 175, 176, pl. 5, figs. 4-7), but differs from the latter in having tertiary septa. It also resembles *Waagenophyllum nogamie* YAMAGIWA (MS) from the Atetsu Limestone, Okayama Prefecture, Japan. The difference between the above two species is shown by smaller corallites and smaller axial structure of the Tamba form, and moreover it has tent-shaped axial tabellae instead of dome-like ones af the Atetsu specimen. It is distinguished from *Waagenophyllum polyseptata* MINATO (1955, pp. 105-107, pl. 21, fig. 3) found in the Middle Permian of the Kitakami Mountainland, Northeast Japan in the following respects; the present species has smaller corallites, less numerous septa in transverse section, and has no tabula in longitudinal section.

Locality and Horizon:—Specimens were collected by Professor Susumu MATSUSHITA of the Kyoto University in a limestone quarry east of Ogonjo, Oharano, Ukyo-ku, Kyoto City. This limestone occurs immediate below a limestone yielding *Waagenophyllum indicum* (WAAGEN and WENTZEL) of the *Yabeina* zone? in the upper part of the Izuruha Formation. Middle Permian.

Repository:—Deposited in Geological and Mineralogical Institute, University of Kyoto. Reg. nos. JPC 10030a (holotype), 40030b (holotype).

Genus *Heritschioides* YABE, 1950

Heritschioides sp. indet.

Pl. 2, figs. 4a, 4b.

Corallum fasciculate, composed of cylindrical corallites. Corallites usually 11 to 13 mm in diameter in transverse section. Septa of two orders, major and minor in alternation. Numbering 20 to 23 for major and as many for minor ones, both being straight or slightly sinuous. Major ones mostly reach axial structure, thick in medial area and thinner towards both ends; some of them connecting with septal lamellae. Minor ones thin, usually one-half to two-thirds length of major. Dissepiments arranged in concentric or angulo-concentric pattern. Axial structure occupies a space of about one-third diameter of corallite. Median plate indistinct.

In longitudinal section, dissepimentarium composed of small vesicles with their convex sides inwards. Tabulae incomplete, composed of small vesicles with their convex sides upwards and outwards, steeply ascending to axial structure. Tabellae composed of small vesicles with their convex sides outwards as well as upwards, steeply ascending to axis. Median plate indistinct. Tabularium occupies two-thirds of entire space of corallite. Axial structure about one-half width of tabularium.

Comparison:—The present species resembles *Heritschioides ojensis* SAKAGUCHI and YAMAGIWA (1958, pp. 170, 171, pl. 1, figs. 4-6) from Oji and *Heritschioides ozakii* SAKAGUCHI and YAMAGIWA (1958, pp. 171, 172, pl. 1, figs. 7-9; pl. 3, figs. 1, 2) from Inukanno, both at Kameoka City, Kyoto Prefecture. It seems to indicate an intermediate form

between the above two species in transverse section, but can be distinctly discriminated from them in longitudinal section. Therefore, if better preserved material is obtained in future, the present species will be able to be proposed as a new species.

As far as the general structure of corallite in transverse section concerned, the present species and *Heritschioides ojensis* are almost nearly indistinguishable. In longitudinal section, however, it has more steeply ascending tabulae than those of the Oji form. It also differs from *Heritschioides ozakii* in larger axial structure of the former and in having steeply ascending tabellae instead of rather dome-like ones of the latter in longitudinal section.

Locality and Horizon:—Specimen was found by Naoya NASHIKI of the Higashi Middle School, Ibaragi City in an old quarry near Konzoji, Oharano, Ukyo-ku, Kyoto City. The limestone of this quarry is referred to the *Triticites montiparus* subzone in the lower part of the Tano Formation in the Western Hills of Kyoto (Kyoto-Nishiyama). Lower Permian.

Repository:—Deposited in Geological Institute, Osaka Gakugei University. Reg. nos. IGOG 62004a, 62004b.

Genus *Huangia* YABE, 1950

Huangia sp. indet.

Pl. 2, figs. 5a, 5b.

Corallum fasciculate, composed of cylindrical corallites, usually 7 to 10 mm in diameter of transverse section in mature stage. Major septa 17 to 22 in number, alternating with an equal number of minor ones. Major ones slightly thick in medial area, thinning both ends, reaching axial structure; some of them connecting with septal lamellae. Minor ones thinner, less than half length of major. Septa almost connected with external wall, but sometimes disappearing into meshes of vesicles of peripheral area. Axial structure loose, composed of septal lamellae and axial tabellae. Median plate usually lacking; it resembles that of the genus *Siphonodendron* in younger stage. Dissepiments arranged concentrically in younger stage, but becoming pseudoherring bone pattern in mature stage.

In longitudinal section, dissepimentarium composed of vesicles with their convex sides facing upwards as well as inwards. Outer tabularium broad, composed of complete or incomplete horizontal tabulae. Tabellae show dome-like structure. Tabularium occupies three-fifths of entire space of corallite. Axial structure one-third width of tabularium.

Comparison:—It is reported that this specimen was collected by the late Shintaro NAKAMURA near Izuruha, Takatsuki City, Osaka Prefecture. However, the writers' recent studies show that there is absent such a black limestone contained the present specimen near Izuruha but present near Kurama in the Northern Hills of Kyoto. For this reason, if it were to be obtained in any other places than Izuruha, it would be found in a black limestone belonging to the *Misellina* sp. subzone at Kurama.

This species closely resembles *Huangia hashimotoi* (NAGAO and MINATO, 1941, pp. 102-105, pl. 27, figs. 1-5; MINATO, 1955, pp. 123-125, pl. 2, figs. 1-3; pl. 22, figs. 3, 4, 6) in the general structure of the transverse section, but the former is smaller in size and fewer in number of septa.

Locality and Horizon:—According to Susumu MATSUSHITA of the Kyoto University, this specimen was collected by

Shintaro NAKAMURA near Izuruha, Takatsuki City, Osaka Prefecture but the exact locality ramains unknown. Probably Middle Permian.

Repository:—Deposited in Geological and Mineralogical Institute, University of Kyoto Reg. nos. JPC 40031a, 40031b.

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Explanation of Plate 2

Stylidophyllum kinkiense SAKAGUCHI and YAMAGIWA, n. sp.

Figs. 1a-b, 2....×3.5

1a. Transverse section of the holotype (Reg. no. IGOG 62002a)

1b. Longitudinal section of the holotype (Reg. no. IGOG 62002b)

2. Transverse section (Reg. no. IGOG 62003)

Locality: Kannontoge, Sonobe-cho, Funai-gun, Kyoto Prefecture.

Waagenophyllum tambense SAKAGUCHI and YAMAGIWA, n. sp.

Figs. 3a-b....×4.0

3a. Transverse section of the holotype (Reg. no. JPC 40030a)

3b. Longitudinal section of the holotype (Reg. no. JPC 40030b)

Locality: Ogonjo, Oharano, Ukyo-ku, Kyoto City.

Heritschioides sp. indet.

Figs. 4a-b....×3.5

4a. Transverse section (Reg. no. IGOG 62004a)

4b. Longitudinal section (Reg. no. IGOG 620064b)

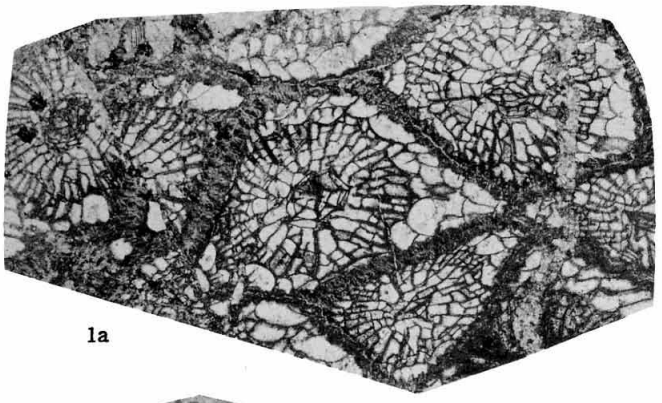
Huangia sp. indet.

Figs. 5a-b....×3.5

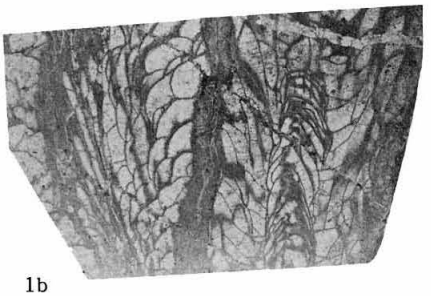
5a. Transverse section (Reg. no. JPC 40031a)

5b. Longitudinal section (Reg. no. JPC 40031b)

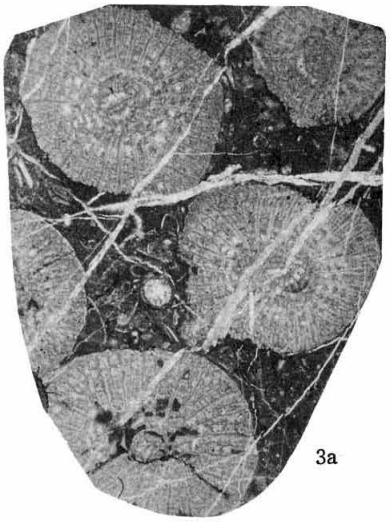
Locality: ? Izuruha, Takatsuki City, Osaka Prefecture.



1a



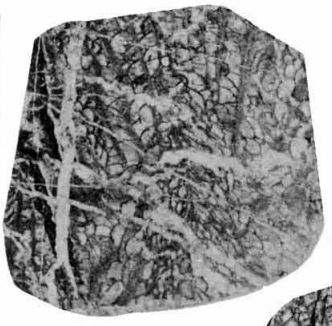
1b



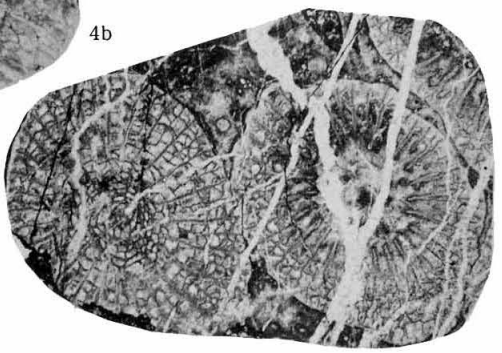
3a

2

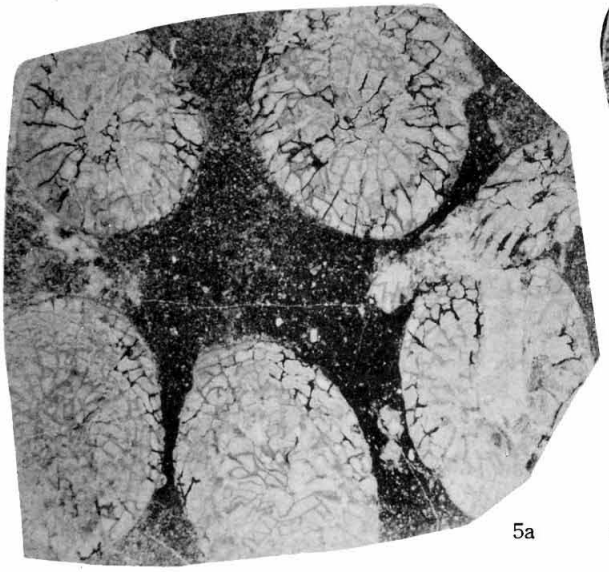
3b



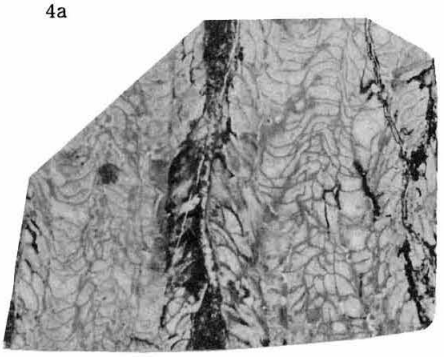
4b



4a



5a



5b

ISHII and AOKI photo.

Trans. Proc. Palaeont. Soc. Japan, N.S., No. 49, pp. 15-24, pls. 3-4, Apr. 10, 1963

444. LOWER CARBONIFEROUS BRYOZOA FROM THE OMI LIMESTONE, JAPAN

PART 2: SUCCESSIVE DESCRIPTIONS OF CRYPTOSTOMATA*

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青海石灰岩産下部石炭紀群虫化石。その 2: その 1 に続いて隠口目 8 属 13 種を記載した。 坂上澄夫

In this paper, the writer describes thirteen species in eight genera as the successive study of the lower Carboniferous Bryozoa from the Omi limestone.

Genus *Polypora* M'COY, 1844

Polypora fujitae SAKAGAMI, n. sp.

Pl. 3, fig. 1.

A single tangential section of zoarium, fan-shaped, frequently dichotomosing, consists of nearly straight branches connected by dissepiments at regular intervals. Branch 0.52 mm to 0.60 mm in width and about 10 in 10 mm horizontal. Dissepiments strong, about 0.36 mm in width. Fenestrules ellipsoidal or rhomboidal with rounded corners in outline, their width and length about 0.60 mm and 0.72 mm to 0.92 mm, respectively; about 8 in 10 mm length of branch. Zooecial apertures circular in shape, arranged in alternating longitudinal series, usually 4 rows on each branch, 17 to 18 in 5 mm length of one row, and usually 4 apertures per fenestrule. Diameters of apertures 0.08 mm to 0.10 mm and interspaces between zooecial apertures 0.16 mm to 0.24 mm. Zooecial tubes rhomboidal to obliquely oval at middle level of branch. Nodes observable, about 0.03 mm in diameter, but their arrangement uncertain. Stereom of both sides composed of fine fibrous striations and closely arranged fine granules.

Meshwork formula:—10/8//17-18/4* (*4: number of rows)

Remarks:—The present form is nearest to *Polypora khvorovae* SHULGA-NESTERENKO (1955) which was reported from the Kashinskii formation of the middle Carboniferous, Russian Platform in the meshwork formula (11-12(10)/8-9//18/4-5), but differs by the fan-shaped zoarium instead of the parallel branched zoarium of the latter. In the general characters, the present form also resembles *Polypora bassleri* which CONDRA (1902) reported from the Coal Measures of Nebraska, the United States of America. However, the present form can be distinguished from *P. bassleri* by the narrower width of branches, wider fenestrules and 17 to 18 zooecia per 5 mm of branch instead of 19 to 20.

The specific name is dedicated to Mr. Hiroshi FUJITA who was recently engaged in the stratigraphic survey of the Omi limestone.

Locality:—Nishiyama. Reg. no. 11218-A (holotype).

* Received Apr. 30, 1962; read June 2, 1962.

Genus *Pennireteporα* D'ORBIGNY, 1849

Pennireteporα cf. *irregularis* (NEKHOROSHEV)

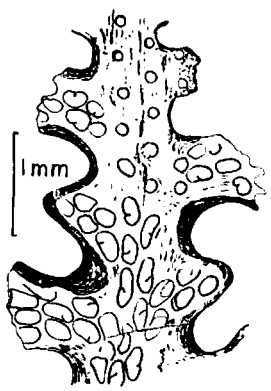
Pl. 3, fig. 5; text-fig. 1.

1948. *Pinnatopora irregularis* NEKHOROSHEV, *Akad. Nauk Kaz. SSR.*, p. 47, pl. 4, fig. 2.

Two tangential sections. One of the specimens (11214), zoarium consists of broad straight main branch 1.00 mm to 1.10 mm in width. Lateral branches 0.60 mm to 0.68 mm in width, extending alternately at variable angles (45° to 100°) and at intervals of 0.40 mm to 0.52 mm with 4.5 branchlets in 5 mm. Zooecial apertures circular, their diamters 0.10 mm. Zooecial tubes with well developed hemisepta, kidney-like shaped at middle level of tangential section, about 13 in 5 mm length of one row, and spaced regularly in 3 per interval between lateral branches. Interspaces between zooecial apertures 0.21 mm to 0.24 mm longitudinal. Single straight carina and some nodes on carina probably present, but indistinct. Inner part of stereom composed of rather coarse fibrous tissue, but the outer part of very fine granules.

Another specimen (11259) shows only a few zooecial arrangement but the structure of stereom covered on reverse side is well observed. Width of main branch and lateral branches 1.10 mm and about 0.80 mm to 1.00 mm, respectively. Lateral branches extending alternately at an angle of about 75° and at intervals of about 0.60 mm with 4 branchlets in 5 mm. Stereom composed of many small spicules arranging in longitudinal rows, and interspaces between one and adjacent rows of spicules about 0.05 mm.

Remarks:—The present form agrees with *Pennireteporα irregularis* (NEKHOROSHEV) which was reported from the middle Carboniferous of near Balkhashia in



Text-fig. 1. *Pennireteporα* cf. *irregularis* (NEKHOROSHEV), tangential section (Reg. no. 11214).

the general appearance except for the width of main branch of the present form which is wider than that of NEKHOROSHEV's specimen. However, NEKHOROSHEV's description and illustration are not sufficient to compare with the present specimens because the detailed structure of stereom and arrangement of spicules are not shown in his illustration. The angle between the main branch and lateral branches is about 60° in NEKHOROSHEV's specimen instead of variable angles (45° to 100°) in the present form.

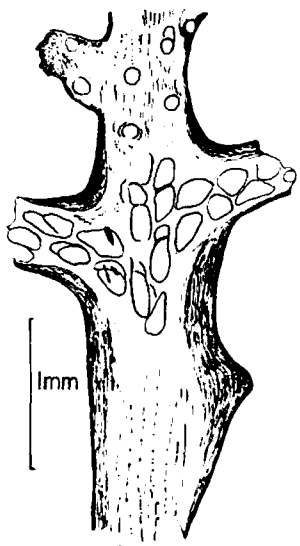
Locality:—Nishiyama. Reg. nos. 11214, 11259.

Pennireteporα higashiyamensis SAKAGAMI, n. sp.

Pl. 3, fig. 3; text-fig. 2.

A single tangential section. Zoarium consists of broad, straight main branch, 0.91 mm in width. Lateral branches 0.52 mm in width, extending alternately at an angle of 70° and at intervals of 0.78 mm to 0.88 mm, with 4 branchlets in 5 mm. Zooecial apertures circular, their diameters about 0.10 mm. Zooecial tubes

with well developed hemisepta, elongated ellipsoidal at middle level of tangential section, about 13 in 5 mm length of one row, and spaced regularly, 3 per interval between lateral branches. Interspaces between zooecial apertures 0.24 mm to 0.28 mm longitudinal. Stereom composed of many small spicules arranged in longitudinal rows, and interspaces between one and adjacent rows of spicules about 0.05 mm. Interspaces between spicules in one row somewhat variable, 0.05 mm to 0.08 mm.



Text-fig. 2. *Penniretepora higashiyamensis* SAKAGAMI, n. sp., tangential section, holotype (Reg. no. 11285).

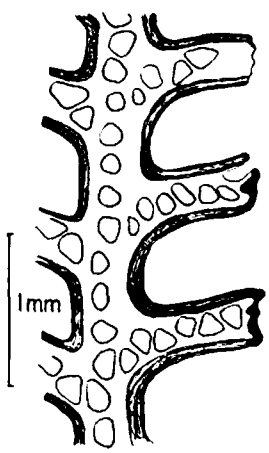
Remarks:—The present form agrees with *Penniretepora* cf. *irregularis* (NEKHOROSHEV) which was described in this paper in the general measurements. However, the difference between the two species is in the arrangements of spicules. The spicules of the present species is arranged more coarser than that of *P.* cf. *irregularis* (NEKHOROSHEV).

Locality:—Higashiyama. Reg. no. 11285 (holotype).

Penniretepora regularis SAKAGAMI, n. sp.

Pl. 3, fig. 4; text-fig. 3.

A single tangential section. Zoarium slender, pinnate, straight midrib. Width of midrib 0.45 mm to 0.48 mm. Lateral branches about 1 mm long and 0.32 mm to 0.37 mm wide, extending alternately at angle of 80 degrees and at intervals of 0.45 mm to 0.56 mm with 6 branchlets in 5 mm. Shape of zooecial aperture not observed. Zooecial tubes arranged in alternating longitudinal series, trapezoidal or triangular with rounded corners at base and middle levels of tangential section, about 12 in 5 mm length of one row, and spaced regularly in pairs per interval between lateral branches. Relatively thin stereom covering zoarium, composed of fine fibrous tissue with spicules. Thickness of stereom about 0.10 mm. Carina and nodes not observed.



Text-fig. 3. *Penniretepora regularis* SAKAGAMI, n. sp., tangential section, holotype (Reg. no. 11215).

Remarks:—Slender and straight main branch with regularly divided lateral

branches, strongly alternated arrangement of zooecial tubes and very thick wall between zooecial tubes are the important characters of the present species. The present form agrees with *Pennirete-pora laxa* var. *kasakhstanica* NEKHOROSHEV (1948) which was reported from the middle Carboniferous near Balkhashia in the width of main branch, number of lateral branches in 5 mm (6) and number of zooecia in 5 mm of main branch (12-13), but it can be distinguished therefrom in the angles between main branch and lateral branches (80° instead of 50°-55°), and by the thicker wall between zooecial tubes.

Locality:—Nishiyama. Reg. no. 11215 (holotype).

Pennirete-pora sp. indet.

Pl. 3, fig. 2.

A single tangential section. Zoarium consists of broad, straight main branch about 0.8 mm in width with short lateral branches. Lateral branches about 0.45 mm in width, extending alternately at an angle of about 90 degrees and at intervals of 0.56 mm to 0.72 mm with 4.5 branchlets in 5 mm. Shape of zooecial aperture not observed. Zooecial tubes arranged in alternating longitudinal series, oval or rounded polygonal at base and middle levels of tangential section. Hemisepta not observed. About 17 zooecia in 5 mm length in row and spaced regularly in 4 per interval between lateral branches. Stereom relatively thin. Carina and nodes not observed.

Remarks:—Only a few species of *Penniretepora* having four apertures in the interval between the lateral branches have been described from the Carboniferous strata of the world. The present form may be a new species, but the specific identification is not made because of the ill-preserved section of specimen and of insufficiency of the material at hand.

Locality:—Nishiyama. Reg. no. 11239-B.

Genus *Protoretepora* DEKONINCK, 1876

Protoretepora hayasakae SAKAGAMI, n. sp.

Pl. 3, figs. 8, 9.

? 1924. *Phyllopora* sp., HAYASAKA, *Sci. Rep., Tohoku Imp. Univ., Ser. 2, Vol. 8, No. 1*, p. 56, pl. 7, fig. 6.

Zoarium flattened, forming reticulate expansion, consisting of flexuous branches and broad celluliferous dissepiments. Width of branches usually 0.80 mm to 1.20 mm but occasionally 0.60 mm, and 6 to 8 branches in 10 mm horizontal. Fenestrules circular or oval, their width and length 0.60 mm to 1.20 mm and 0.70 mm to 1.20 mm, respectively; 5 to 8 fenestrules in 10 mm vertical. Zooecial apertures arranged in alternating longitudinal series, usually 4 to 5 rows on each branch. Zooecial tube rounded rhomboidal at base and middle levels of tangential section. Zooecial apertures without peristomes, circular and their diameter 0.14 mm to 0.16 mm. Distance between zooecial apertures along longitudinal row 0.16 mm to 0.20 mm. Dissepiments consist of same rows of zooecia as those of branches, but in places, division into branches and dissepiments indistinct. On reverse surface, both branches and dissepiments rounded and smooth, but slightly convex at dissepiments. Thick stereom covering reverse side, but becoming very thin at obverse.

Remarks:—Many species of *Protoretepora* have been known from the Permian of Australia, Salt Range of India and

the other localities under the generic name of *Phyllopora*. From the Carboniferous, however, only a few species of the genus may have been described. The present form can be easily distinguished from the species previously described except for *Phyllopora* sp. which HAYASAKA described and illustrated from an unknown locality of the Omi limestone. The present form resembles HAYASAKA's specimen in the meshwork measurements.

The specific name is dedicated to Dr. Ichiro HAYASAKA who is a pioner of the Paleozoic Bryozoa in Japan.

Locality:—Nishiyama. Reg. no. 11279 (surface, holotype), 11233, 11265.

Genus *Rhabdomeson* YOUNG and YOUNG, 1874

Rhabdomeson yabei SAKAGAMI, n. sp.

Pl. 3, fig. 7.

Zoarium consisting of straight, slender cylindrical stem, about 2 mm in diameter, not observed to branch. Central tube 0.32 mm in diameter. Thickness of mature zone about 0.50 mm. Zooecial apertures regularly arranged in longitudinal series, 3.5 in 2 mm; and diagonally intersecting one another, 5 in same distance and longer diameter 0.16 mm to 0.19 mm and shorter one 0.10 mm to 0.13 mm. Zooecial tube making an angle of 30° to central tube in immature zone, but becomes perpendicular to surface in mature zone; oval in tangential section of mature zone. Wall thickened in mature zone, distinguishable from very thin immature wall. Interspaces between zooecial tubes in mature zone 0.32 mm to 0.40 mm in longitudinal row, and 0.16 mm to 0.19 mm in diagonal row. Superior hemisepta poorly developed at posterior end of mature zone, and inferior hemisepta disposed at opposite side of slightly inner parts of superior hemisepta. Two kinds of acanthopores —megacanthopores usually disposed at distal edge of each zooecium, micracanthopores around zooecial tube arranged in one row. Diaphragms not present.

Remarks:—Almost all of the species belonging to the genus *Rhabdomeson* from the Carboniferous rocks have more larger diameter of zoarium than the present form. The present form is nearest to *Rhabdomeson rhombiferum* PHILLIPS which was reported from the middle to upper Carboniferous of the several localities in Soviet Russia in the diameter of zoarium and some characters of internal structures. However, the present form can be distinguished from *R. rhombiferum* by the weaker developed hemisepta and larger micracanthopores.

Recently, ELIAS (1957) described three species of transitional forms between the genera *Rhabdomeson* and *Rhombopora*, and at that time, he stated that "axial tube in this genus could not possibly be originally hollow, but was filled with some kind of soft or liquid organic substance, and its occasional filling with surrounding matrix must have been a secondary phenomenon." The axial tube of the present form is also filled with the same material as the surrounding sediments.

The specific name is dedicated to Dr. Hisakatsu YABE, the father of paleontology in Japan.

Locality:—Nishiyama. Reg. nos. 11202 (holotype), 11201.

Genus *Rhombopora* MEEK, 1872

Rhombopora sp. indet.

Pl. 3, fig. 6.

A single oblique section. Zoarium a cylindrical stem, about 1.6 mm in diameter. Zooecial tube bending gently outward in longitudinal section, oval, somewhat irregularly near surface of transverse section, its diameter 0.16 mm to 0.18 mm, and shorter one 0.11 mm to 0.13 mm. Zooecial tube probably arranged in longitudinal intersecting rows. Zooecial wall thin in immature region, becoming thick gradually to surface. Near surface, interspaces between zooecial tubes 0.06 mm to 0.08 mm in longitudinal trend; 0.02 mm to 0.03 mm in diagonal trend. One megacanthopore porous, surrounded by concentric dark fibrous tissue, usually present in each point of intersection of zooecial walls. Diameter of megacanthopore measured from edge to fibrous tissue 0.040 mm to 0.048 mm and its inner diameter 0.006mm to 0.008 mm. One or two micracanthopores in one row in each interspace of megacanthopores. Mesopore and diaphragm lacking.

Remarks:—The present form differs from the previously described species. The megacanthopore with large pore, no diaphragm and no hemisepta are the characters of the present species.

Locality:—Higashiyama. Reg. no. 11294.

Genus *Streblascopora* BASSLER, 1952

Streblascopora amabilis SAKAGAMI, n. sp.

Pl. 4, figs. 1-3.

Zoarium slender and ramose, its diameter 1.0 mm to 1.2 mm. Central bundle of small parallel tubes surrounded by zooecial tube, circular, and 0.24 mm to 0.29 mm. Number of tubes in central bundle 10 to 20 in transverse section, 4 to 5 rows observed in longitudinal section. Zooecial apertures regularly arranged in longitudinal series, 7 in 2 mm, oval, and their longer diameters 0.11 mm to 0.13 mm and shorter ones 0.08 mm to 0.11 mm. Zooecial tube making an angle of about 30° to central bundle in immature zone, but tube near opening becomes perpendicular to surface. Interspaces between zooecial tubes in mature zone 0.19 mm to 0.26 mm in longitudinal row. Thickness of mature zone 0.16mm to 0.24 mm. Mesopores straight, arise at right angles from base of mature wall, usually 2 rows with 2 to 3 in each row longitudinal, one mesopore disposed at distal edge of each zooecium between ordinary rows, and total number of mesopores disposed between zooecia in one row usually 5 or 7. Diameter of mesopore 0.24 mm to 0.29 mm. Superior hemiseptum poorly developed at posterior end of mature zone, and well developed 2 or 3 inferior hemisepta developed at opposite side of superior hemiseptum at about same distances from each other.

Remarks:—About a dozen species of the genus *Streblascopora* have been described from the Permian rocks but they were reported as of the genus *Streblotrypa* except for two or three species recently described. On the other hand, also in the Carboniferous rocks, a considerable number of species described as *Streblotrypa* should be referred to the genus *Streblascopora*. At least, the following two species, *Streblotrypa densa* MOROZOVA (1955) and *Streblotrypa nikiforovae* MOROZOVA (1955), which have apparently the central bundle can be included into the genus *Streblascopora*. Some other species including *Streblotrypa* may now also be expected to belong to *Streblascopora* by the reexaminations of internal structures.

The present form resembles *Streblascopora densa* (MOROZOVA) which was reported from the Gzhelian Stage (*Triticites stuckenbergi* zone) of the mid-valley of the Don in its general appearances, but it can be distinguished by the more strongly intercalated zooecia in longitudinal series and smaller size of mesopore.

Locality:—Nishiyama. Reg. nos. 11272 (holotype), 11205, 11212, 11216-B, 11244-A, 11256, 11267-B, 11271-B.

Streblascopora grossa SAKAGAMI, n. sp.

Pl. 4, figs. 4, 5.

Zoarium consisting of cylindrical stem, its diameter 1.7 mm to 2.0 mm, not observed to branch. Proximal part spreading to attach with foreign substance. Central bundle of small parallel tubes surrounded by zooecial tube, circular, about 0.30 mm in diameter. Number of tubes in central bundle about 7 to 10 in transverse section, usually 3 rows observed in longitudinal section. Zooecial apertures regularly arranged in longitudinal series, but in proximal part, seem to be arranged rather irregularly. Number of zooecia in 2 mm cannot be counted. Zooecial tube near surface oval at ordinary part, its larger diameter 0.12 mm to 0.16 mm and smaller one 0.06 mm to 0.08 mm; circular at proximal part, its diameter usually larger than that of ordinary part, 0.09 mm to 0.13 mm. Zooecial tube arises from central bundle at an angle of 20° to 30° and becomes perpendicular to surface. Interspaces between zooecial tubes in mature zone about 0.24 mm. Wall of adjacent zooecial tubes in immature zone separated by a dark line. Thickness of mature zone 0.48 mm to 0.56 mm. Mesopores straight, arise at right angles from base of mature wall, and regularly arranged in two rows with 3 or more in each row longitudinal; but rather irregularly arranged at proximal part. Mesopore variable in form and size, circular to elongated elliptical, 0.016 mm to 0.040 mm. Superior hemiseptum poorly developed at posterior end of mature zone, and well developed inferior hemiseptum disposed at opposite side of inner part of superior hemiseptum.

Remarks:—The present form is characterized by the relatively large diameter for the genus, nearly straight and long zooecial tubes in mature zone, rather narrow central bundle and wall of the adjacent tubes being separated by a dark line in immature zone. The present form is similar to *Streblascopora lineata* SAKAGAMI and AKAGI (1961) which was reported from the lower Permian of the Taishaku Plateau, Japan in the wall structure of immature zone, but differs by the other character above mentioned.

Locality:—Nishiyama. Reg. no. 11241-A (holotype); Higashiyama, Reg. no. 11285.

Genus *Streblotrypella* NIKIFOROVA, 1948

Streblotrypella? sp. indet.

Pl. 4, fig. 6.

A single longitudinal section of a fragment of branched zoarium. Diameter of zoarium 1.8 mm. Zooecial apertures may be regularly arranged in longitudinal series. Zooecial tube near surface circular or oval, and its diameter about 0.01 mm to 0.11 mm. The tube seems to arise from a linear axis at an angle of about 30 degrees, gradually bends outward and becomes perpendicular to surface in mature zone. Wall of zooecial tube

composed of concentric fibrous tissue, about 0.03 mm thick. Thickness of mature zone about 0.40 mm. Superior and inferior hemisepta indistinct. Mesopores arranged in two rows, and its total number dispcsed between zooecial tubes in one row 2 to 5. Inner diameter of mesopore 0.032 mm to 0.048 mm. Interspaces between zooecial tubes near surface about 0.13 mm.

Remarks:—The present form is questionably included in the genus *Streblotrypella*, because the central axis is obscure but may be present. The writer examined the species belonging to the genera *Streblotrypa* and *Streblotrypella*, and found that at least *Streblotrypa paralleia* CROCKFORD which was reported from the lower Carboniferous of New South Wales should be referred to *Streblotrypella*. The present form is not identical with already described species of the genus, however, better speciemens are wanted for determination of the specific name.

Locality:—Nishiyama. Reg. no. 11236.

Genus *Sulcoretepora* D'ORBIGNY, 1849

Sulcoretepora complicata

SAKAGAMI, n. sp.

Pl. 4, fig. 7.

Zoarium bifoliate, branching in plane of mesotheca. Mesotheca straight, apparently a closely joined double layer, reaching surface at acute edges of zoarium. Width and thickness of zoarium about 3 mm and 1.2 mm to 2.0 mm? (the larger unknown owing to bad orientation), respectively. Zooecial tubes parallel to mesotheca for a very short distance, and then rapidly making large angles in mature region. Zooecial tubes near surface in tangential section circular, 0.14 mm to 0.21 mm in diameter, arranged longitudinally, 10 to 11 rows of zooecia in one side of zoarium, 4 to 5 in 2 mm longitudinal, and 5.5 to 6 in the same space diagonal. Interspaces between adjacent zooecial tubes in mature zone 0.16 mm to 0.40 mm longitudinal, 0.12 mm to 0.22 mm diagonal. Vesicular tissue regularly arranged,

Explanation of Plate 3

Fig. 1. *Polypora fujitae* SAKAGAMI, n. sp.
Tangential section of holotype, ×10, Reg. no. 11218-A.

Fig. 2. *Pennıretepora* sp. indet.
Tangential section, ×10, Reg. no. 11239-B.

Fig. 3. *Pennıretepora higashiyamensis* SAKAGAMI, n. sp.
Tangential section of holotype, ×10, Reg. no. 11285.

Fig. 4. *Pennıretepora regularis* SAKAGAMI, n. sp.
Tangential section of holotype, ×10. Reg. no. 11215.

Fig. 5. *Pennıretepora* cf. *irregularis* (NEKHOROSHEV)
Tangential section, ×10. Reg. no. 11214.

Fig. 6. *Rhombopora* sp. indet.
Oblique section ×20, Reg. no. 11294.

Fig. 7. *Rhabdomeson yabei* SAKAGAMI, n. sp.
Longitudinal section of holotype, ×20, Reg. no. 11202.

Figs. 8, 9. *Protoretepora hayasakae* SAKAGAMI, n. sp.
8, Obverse surface of holotype, 9, reverse surface of holotype, ×5, Reg. no. 11279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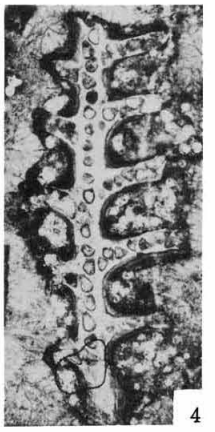
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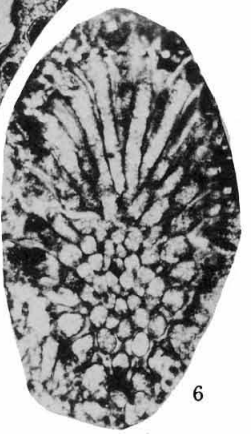
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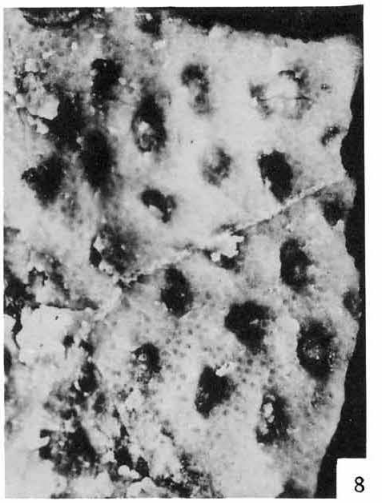
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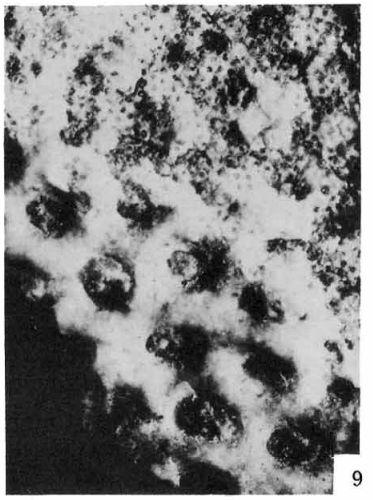
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SAKAGAMI photo.

usually consisting of one row of vesicles between longitudinal rows of zooecia, two or three rows composed of two or three vesicles in one row between zooecia in one zooecial row. These arrangements become indistinct near surface. Shape of vesicles rectangular in both tangential and longitudinal sections, vesicular tissue becoming gradually compressed on approaching surface of zoarium. About one half near surface covered by dense fibrous tissue.

Remarks:—The present form rather resembles the Permian species *Sulcoretepora nipponica* SAKAGAMI (1961) which was reported from Kamiyatsuse and Iwaizaki of the Kitakami massif, Japan than the Carboniferous species already described in the more complicated inner structures. The differences between the present form and *S. nipponica* can be recognized only in the number of zooecial tubes per 2 mm in longitudinal row; 4 to 5 in the present form instead of 3 in *S. nipponica*. The other characters of the present form seem to be identical with that of the latter.

Locality:—Nishiyama. Reg. nos. 11274 (holotype), 11237, 11273.

Sulcoretepora? sp. indet.

Pl. 4, figs. 8, 9.

Zoarium bifoliate, straight stem, not observed to branch. Mesotheca apparently a closely joined double layer, reaching surface at edges of zoarium. Width and thickness of zoarium 1.5 mm and 1.1 mm, respectively. Zooecial tubes parallel to mesotheca for a short distance, and then gradually bending outward. Zooecium oval in tangential section, its larger diameter 0.12 mm to 0.16 mm and shorter one 0.06 mm to 0.08 mm. Vesicular tissue well developed in inner part of zoarium. Vesicles variable in size, rounded rectangular or polygonal in longitudinal section. Stereom well developed but rather thin, its thickness 0.16 mm to 0.20 mm.

Remarks:—The present form consists of less complicated inner structures and more rounded form than the above described species, and is considered to be new to science. However, there are some doubt to include it in the genus *Sulcoretepora* although the branching part of the zoarium could not be observed, because the inner structures of the genus, especially in the case of the structures being very complicated, is similar to that of the hexagonellid genera such as *Ramipora*, *Goniocladia* and *Volgia*. Therefore, the specific name must wait until more specimens accumulate.

Locality:—Higashiyama. Reg. no. 11295.

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Explanation of Plate 4

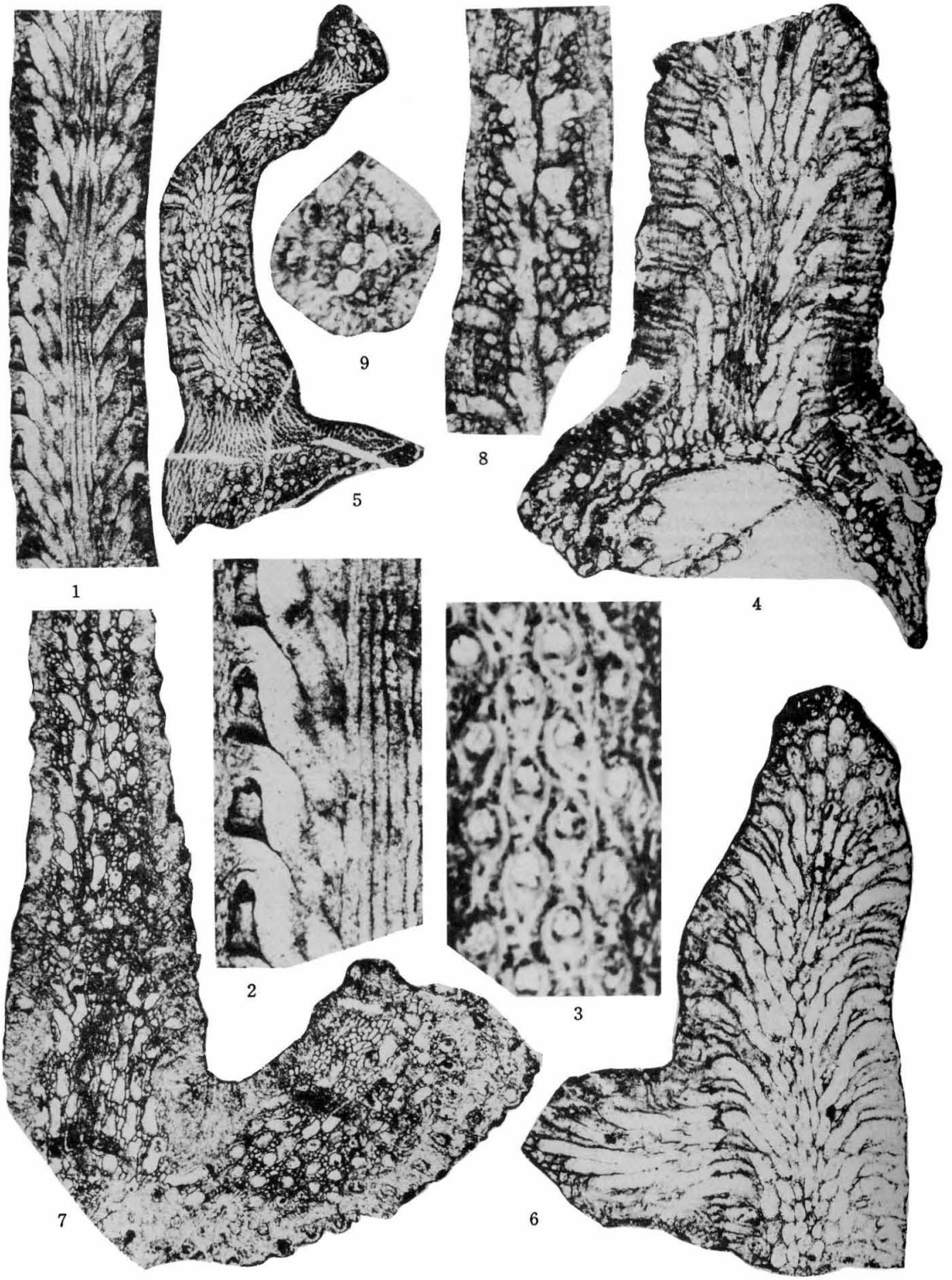
Figs. 1-3. *Streblascopora amabilis* SAKAGAMI, n. sp.
1, Longitudinal section of holotype, ×20, Reg. no. 11272, 2, enlarged part of holotype, ×40, 3, tangential section of paratype, ×40, Reg. no. 11216-B.

Figs. 4, 5. *Streblascopora grossa* SAKAGAMI, n. sp.
4, Longitudinal section of holotype, ×20, Reg. no. 11241-A, 5, longitudinal section of paratype, ×10, Reg. no. 11285.

Fig. 6. *Streblotrypella*? sp. indet.
Longitudinal section, ×20, Reg. no. 11236.

Fig. 7. *Sulcoretepora complicata* SAKAGAMI, n. sp.
Tangential section of holotype, ×10, Reg. no. 11274.

Figs. 8, 9. *Sulcoretepora*? sp. indet.
8, Longitudinal section, ×20, Reg. no. 11295-A, 9, transverse section ×20, Reg. no. 11295-B.



SAKAGAMI photo.

Trans. Proc. Palaeont. Soc. Japan, N. S., No. 49, pp. 25-28, pl. 5, Apr. 10, 1963

445. NEW SPECIES OF *GADUS* FROM THE PLIOCENE OF JAPAN*

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日本鮮新統産鱈化石：青森県浜田層および山形県加茂沖より採集された耳石について，北太平洋並に北大西洋に現生する鱈属および近似属と比較検討し，*Gadus chikagawaensis* n. sp. および *Gadus masudai* n. sp. と命名した。　畑井小虎・小高民夫

Introduction

Although the genus *Gadus* is common in the waters of the North Pacific, especially along the eastern coast of Hokkaido, there has been no record of its species from the Cenozoic deposits extensively distributed in the Japanese Islands.

In the collection at hand there are two species of the genus *Gadus*, one from the Pliocene Hamada formation (HATAI, MASUDA and SUZUKI, 1961) exposed along the Chikagawa stream flowing through Tanabu-machi, Shimo-Kita-gun, Aomori Prefecture, and another dredged from a depth of 52 meters off Kamo-machi, Yamagata Prefecture. The latter specimen is water worn, colored dark reddish brown as if due to iron-oxidation and more or less similar to the specimen from the Hamada formation just mentioned. Both of these specimens differ from the Recent species of the genus *Gadus* in features thought to be worthy of their specific separation from the living species.

Since it is known that Pliocene fossils have been dredged from the sea bottom of the Japan Sea bordering Niigata, Yamagata, Akita and Aomori Prefectures (HATAI, 1939), the Korea and Tsushima Straits, off the coast of Yamaguchi and Shimane Prefectures (NIINO, 1934; KOTAKA, 1951, 1959), the discovery of a *Gadus*-specimen showing fossil-aspect is not unreasonable.

Gadus macrocephalus TILESIUS from the North Pacific Ocean, particularly the eastern coast of Hokkaido southwards to Rikuzen, *Gadus luscus* LINNAEUS and *Gadus morshua* LINNAEUS, both from around the British Islands in the eastern North Atlantic Ocean are all characteristic in the long and narrow shapes of their ear-bones. These species have crude tubercular ornamentation on their outer face and their smoother inner face show longitudinal sulcus which is generally only slightly depressed.

Showing resemblance with the ones just mentioned is *Theragra chalcogramma* (PALLAS) from the sea of eastern Hokkaido, the differences between them being the strength and development of the crude tubercular sculpture of the outer face, details of the longitudinal sulcus of the inner face, degree of curvature of the narrow shafts and other minute details.

From comparative morphological studies on the shafts of the Recent and fossil species above mentioned, it is clear that the grade of variation shown by the specimens are within recognizable limits, and that the differences between

* Received June 13, 1962; read June 2, 1962.

the variation-groups of the species do not appear to overlap one another, for which reason, specific classification of them is rendered reasonable.

Since the specimen from the Pliocene Hamada formation can be distinguished from previously known species it is described in the following lines as new to science.

Description

Gadus chikagawaensis HATAI and KOTAKA, n. sp.

Pl. 5, figs. 3, 4.

Shaft about 23.0 mm in length, of outer face, nearly 9 mm in height and moderately thick; outer face gently concave, inner face convex. Anterior side more acutely pointed than posterior, extremities narrowly rounded. Dorsal side more arched than nearly straight ventral. Outer face longitudinally depressed in middle part, depressed area more distinct on posterior half than anterior. Dorsal and ventral borders with distinct, bluntly rounded tubercular structures, numbering about five to six per 5 mm on middle part of dorsal border and about five per 5 mm on ventral. Each tubercle gradually becoming narrower in width and meeting each other at central anterior part but not elsewhere where they terminate in longitudinal central depression. Ridges broad and with sharp tops at central anterior part but elsewhere merely rounded. Tubercle forming anteriormost and posteriormost parts or extremities largest and well rounded. Inner face with longitudinal depression or sulcus bordered with rounded ridges and measuring about 20 mm in length and about 4 mm in maximum width, open anteriorly but not reaching posterior margin. Dorsal area of inner face with ridges extending to sulcus margin, comb-like in appearance, but ridges much broader and gently rounded compared with valley-like interspaces, becoming oblique near anterior and posterior extremities, otherwise quite perpendicular to sulcus. Area dorsal to median sulcus much broader than that ventral to it. Dorsal part of median sulcus appearing blocky due to quadrangular separated, slightly elevated, flat-topped ridges with sharp borders numbering 7 in posterior part of sulcus and only one longitudinally elongated one in anterior part. Anterior one separated from posterior ones by rather wide depressed area.

Locality, geological formation, geological age and repository:—Cliff of the Chikagawa Stream flowing through Chikagawa, Tanabu-machi, Shimo-Kita-gun, Aomori Prefecture. Hamada formation. Early Pliocene. Preserved in the collec- of the Institute of Geology and Paleontology, Tohoku University, Sendai, Japan, IGPS coll. cat. no. 79164.

Comparison:—The present new species was compared with the earbones of the Recent *Gadus macrocephalus* TILESIUS (pl. 6, figs. 5-10) collected from the Pacific Ocean of eastern Hokkaido and northeastern Honshu, *Gadus morshua* LINNAEUS (figs. 13, 14) and *Gadus luscus* LINNAEUS (figs. 15, 16) both from the Atlantic Ocean off the British Islands, and with *Theragra chalcogramma* (PALLAS) (figs. 11, 12) from southeastern Hokkaido. Among these mentioned species of *Gadus* only *Gadus macrocephalus* TILESIUS and *Theragra chalcogramma* (PALLAS) are worthy for comparison because the others are of either different shape or with different kind of sculpture on their outer and inner faces.

Compared with the common living species, *Gadus macrocephalus*, the present

one can be distinguished therefrom by the much weaker tubercles and ridges of the outer face, better development of the terminal tubercle of the anterior and posterior parts and by the details of the sulcus.

The present new species is also distinguishable from *Theragra chalcogramma* (PALLAS) by having stronger sculpture of both outer and inner faces.

Remarks:—The Recent specimen used for comparison with the fossil material in the present paper are those collected from the sea off eastern Hokkaido and northeastern Honshu, specimens bought at the market in Sendai City, and those received in exchange from Dr. F. C. STIRTON of England, to whom the writers express their thanks. It may be added that considerable difficulty arises in studying ear-bones because they must be extracted from Recent material identified by specialists, and the specimens are those collected in person from various parts of the Japanese Islands.

The specimen dredged from a depth of 52 meters off Kamo, Yamagata Prefecture (IGPS coll. cat. no. 79165) is somewhat water-worn and iron-colored (fossil), measures about 19 mm in length and nearly 8 mm in dorso-ventral direction. This specimen differs from *Gadus chikagawaensis* is having a less number of stronger tubercles at the dorsal and ventral marginal areas, a more defined longitudinal central depression which is sharply incised, two outstanding tubercles midway between the anterior and posterior extremities on the outer face, more rounded anterior and posterior extremities, and more uniformly rounded ridges extending towards the medial longitudinal depression. From these differences between the present specimen and the newly described one, it is considered that it must be retained as a distinct form.

Compared with *Gadus macrocephalus* TILESIUS which is the most similar species among the genus *Gadus*, the present one (probably of Pliocene age) differs in the general shape of the ear-bone, stronger but less elevated and more rounded ridges extending from the dorsal and ventral borders towards the longitudinal depression of the outer face, development of two outstanding tubercles in the middle part of the outer face, and by the more defined longitudinal depression of the outer faces.

From the differences from the two more closely related species, *Gadus chikagawaensis* and *Gadus macrocephalus*, the present specimen dredged from off Kamo, is considered to represent an undescribed form. For this specimen the name of *Gadus masudai* HATAI and KOTAKA, n. sp. (pl. 5, figs. 1, 2) is proposed. It is hoped that more specimens of this species will be found by future dredge operation in the Japan Sea.

Gadus masudai from its coloration and grade of preservation is considered to be a fossil reworked from the Pliocene strata now submerged (NOMURA and HATAI, 1937) in the Japan Sea. It is known that Pliocene fossils are not rare in the materials dredged from the bottom of the Japan Sea (HATAI, *op. cit.*), and it is of interest that they are generally discolored and usually distinguishable from Recent specimens although sometimes distinction is difficult. Particularly it should be mentioned that extinct species of marine molluscs are known to be found in the materials dredged from the sea bottom, and brachiopods of the same category also occur. Also the present geographical distribution of the *Gadus*, suggests that the present specimen is a fossil one.

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Explanation of Plate 5

Figs. 1, 2. *Gadus masudai* HATAI and KOTAKA, n. sp. ×2
Submerged Pliocene deposits, off Kamo, Yamagata Prefecture. IGPS coll. cat. no. 79165. Coll. K. MASUDA. 1; outer face, 2: inner face.

Figs. 3, 4. *Gadus chikagawaensis* HATAI and KOTAKA, n. sp. ×2
Hamada formation, Pliocene. Cliff of the Chikagawa Stream flowing through Chika-gawa, Tanabu-machi, Shimo-Kita-gun, Aomori Prefecture. IGPS coll. cat. no. 79164. Coll. K. HATAI. 3; outer face, 4; inner face.

Figs. 5,-8. *Gadus macrocephalus* TILESIUS ×2
Recent, bought at Ishinomaki City, Miyagi Prefecture. 5; outer face, 6; inner face, 7; outer face, 8; inner face.

Figs. 9, 10. *Gadus macrocephalus* TILESIUS ×5
Recent, bought at Yuriage, Miyagi Prefecture. 9; outer face, 10: inner face.

Figs. 11, 12. *Theragra chalcogramma* (PALLAS) ×2
Recent, Mororan, Hokkaido. 11; outer face, 12; inner face.

Figs. 13, 14. *Gadus morshua* LINNAEUS ×5
Recent, Atlantic Ocean. 13; outer face, 14; inner face.

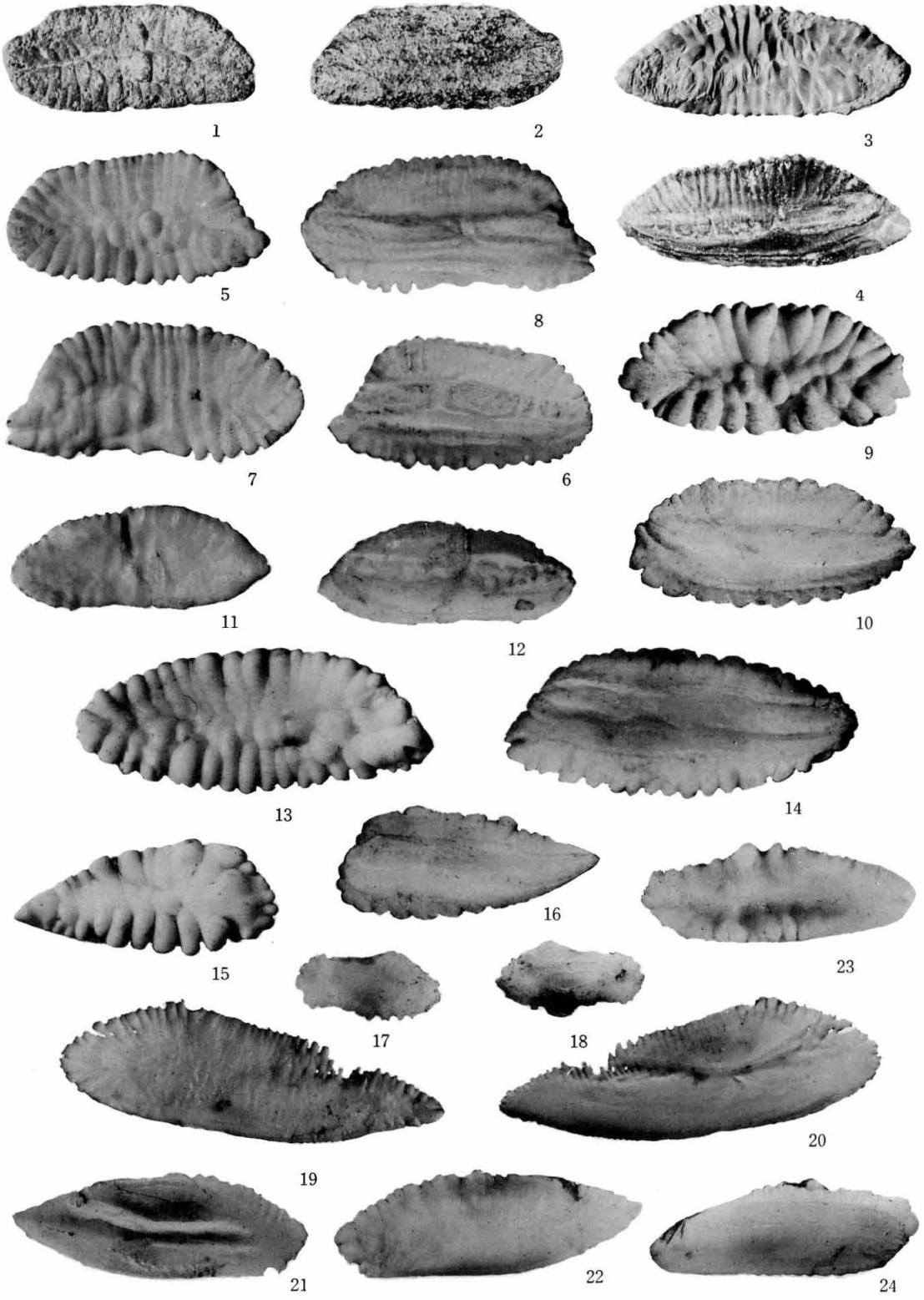
Figs. 15, 16. *Gadus luscus* LINNAEUS ×5
Recent, Atlantic Ocean. 15; outer face, 16; inner face.

Figs. 17, 18. *Mugil cephalus* LINNAEUS ×5
Recent, Sagami Bay, Kanagawa Prefecture. 17; outer face, 18; inner face.

Figs. 19, 20. *Merluccius vulgaris* FLEMING ×2
Recent, Australia. 19; outer face, 20; inner face.

Figs. 21, 22. *Neoplatycephalus macrodon* FLEMING ×3
Recent, Australia. 21; outer face, 22; inner face.

Figs. 23, 24. *Urophycis braziliensis* KAUP ×3
Recent, Brazil. 23; outer face, 24; inner face.



KUMAGAI photo.

Trans. Proc. Palaeont. Soc. Japan, N. S., No. 49, pp. 29-38, pl. 6, Apr. 10, 1963

446. REMARKS ON SOME FOSSIL *DOSINIA* OF JAPAN*

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Dosinia 化石の二三について：殻の保存されているものと殻のとけ去った内型の形体的特徴を比較考察し，内型を基として記載された *Dosinia tugaruana* を再検討した。その他 *Dosinia akaisiana*, *Dosinia hataii*, n. sp., *Dosinia kannoi*, n. sp. を記載し，夫々の産出層準について考察した。

増田孝一郎

Introduction

The pelecypod molluscan genus *Dosinia* is one of the interesting and most predominant groups among the fossil pelecypods of Japan. Because the genus *Dosinia* from the Cenozoic deposits of Japan is abundant in individuals, comprises a number of species, and shows a wide range in surface sculpture, extensive geographical distribution, rather restricted geological range of its respective species, it should be accepted as one of the taxons very important both in stratigraphy and chronology. Further from the living habitat of the dosinid species interpretation of the fossil one can be analysed.

From Japan and the adjacent regions a total of 25 species of *Dosinia* have been described from the Cenozoic strata, among which 20 are fossil and extinct species, and 21 are known from the Recent seas around the Japanese Islands.

The morphological features of *Dosinia* are so simple that classification of the species have often caused confusion. Confusion has also arised in discriminations because the type specimens of fossil *Dosinia* have been based upon imperfect specimens which are sometimes fragments or inner molds.

The numerous specimens, fossil and Recent of Japan and the adjacent regions and of foreign countries, preserved in the collections of the Department of Geology, Faculty of Education, in the Institute of Geology and Paleontology, Faculty of Science, both of the Tohoku University, and in the Saito Ho-on Kai Museum, all in Sendai City, were studied by the writer.

In the present article discussions on the classification, especially on the relationships between the fossil specimens with shell materials and those without them, and the descriptions of some species including two new forms are given. Remarks are given on the stratigraphical data of some Miocene dosinid species because of their biostratigraphical importance in the Neogene deposits of Japan.

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his encouragement. Appreciation is given to Drs. Tamio KOTAKA and Shozo HAYASAKA of the Institute of Geology and Paleontology, Tohoku University, for their discussions on problems relating to the paleontology of the genus *Dosinia*.

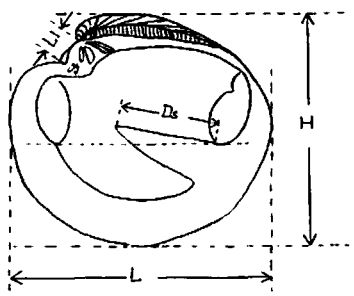
Some Notes on Classification

For the sake of convenience the terminology employed in the present study is explained below (text-fig. 1).

A. Shell-size
- Small .....less than 35 mm. in length
- Medium.....between 35 mm. and 60 mm. in length
- Large .....exceeding 60 mm. in length

B. Convexity of valves
- Slight.....depth/length less than 0.2
- Moderate ....depth/length between 0.2 and 0.3
- Great .....depth/length exceeding 0.3

C. Pallial sinus
- Shallow .....depth of sinus/length less than 1/3
- Medium..... depth of sinus/length between 1/2 and 1/3
- Deep .....depth of sinus/length exceeding 1/2

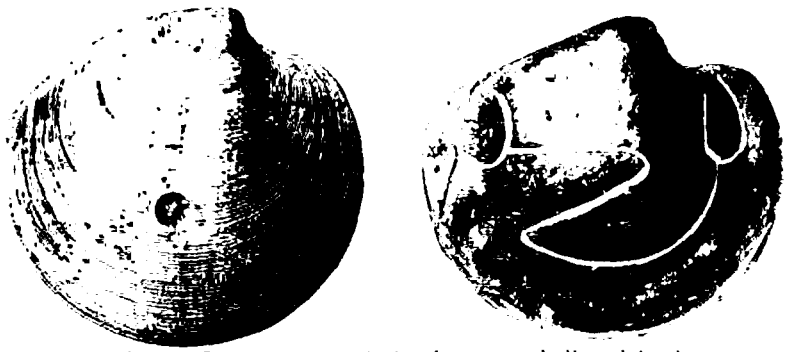


Text-fig. 1. H—Height, L—Length, Ds—Depth of sinus, Ll—Length of lunule.

The fossil specimens of *Dosinia* frequently occur with the original shell materials completely dissolved and thus represent molds. Since the shell of *Dosinia* is thicker near the hinge area than elsewhere, the morphological characters of the fossil specimens lacking the shell materials differ considerably from the original ones in which the shell materials are retained. Therefore, it is very often quite difficult to discriminate the precise position of the species in the case of mold specimens. To overcome such difficulties the writer has tried to compare the morphological characters of the specimens preserving their external shell with their molds. This procedure was by inserting plaster of paris or modelling compound into the inner shell of the specimens or into their casts (text-fig. 2).

As the results repeated experiments the writer observed the following interesting facts. In the case of the specimens consisting of molds, (1) the height and depth of shell becomes smaller than the original form, (2) the beak tends to recede posteriorly and somewhat upwards, so that, the beak shows features different from the original form, (3) the curvature of the postero-dorsal margin becomes considerably smaller compared with that of the original form, and (4) the lunule tends to become obscure. In the case of the shells with obscure lunule the anterior part tends to become somewhat concave towards antero-dorsal margin, but in the case of the shells having the distinct lunule the anterior part becomes concave considerably. (5) the antero-dorsal and postero-dorsal margins are frequently broken, because the shells at such parts are very thin compared with the other parts. (6) the features of the escutcheon become obscure, and (7) the surface sculptures are usually not observed, very vague, or only observed insufficiently.

The above mentioned features can always be observed in any one species, but the grade of difference between the



Text-fig. 2. Showing the relation between shell and its inner mold of *Dosinia* (*Phacosoma*) *japonica* (REEVE).

original form and the molds will vary from species to species. Therefore, it is necessary to have adequate knowledge of the above mentioned features when studying fossil specimens in which the original shell materials has been lost. In the case of water worn shells the morphological characters of the outer surface usually tend to become different from those of the original form, that is to say, the concentric growth lines of the water worn shells are usually lower, flat-topped and stout compared with the original form and may give the impression of a different species.

Experiments as above mentioned are being continued with other kinds of bivalves and in addition slicing of the shells and their structures in profile and surface are also planned for study.

Description

Family Veneridae

Subfamily Dosiniinae

Genus *Dosinia* SCOPOLI, 1777

Dosinia akaisiana NOMURA, 1935

Pl. 6, figs. 3-5.

1935. *Dosinia akaisiana* NOMURA, *Saito Ho-on Kai Mus., Res. Bull., No. 6*, p. 60, pl. 8, figs. 1-6.

1961. *Dosinia akaisiana*, IWAI, *Trans. Proc. Palaeont. Soc. Japan, N.S., No. 41*, pl. 1, fig. 7.

Holotype:—SM*. Reg. No. 6061.

Description:—Shell small, moderate in thickness, rather greatly inflated, suborbicular in outline, nearly as long as high. Anterior side well rounded, passing gradually into broadly rounded ventral margin; antero-dorsal side short, concave in front of beak; postero-dorsal side long, broadly rounded, gradually passing into ventral margin. Beak pointed, curved forward, situated anteriorly at about 3/4 of shell length; lunule cordate in shape, rather small, deeply impressed; escutcheon linear, somewhat impressed but rather obscurely defined by rather obscure ridge. Surface sculptured with rather low, close-set, lamellated concentric growth lines, about 23 per 10 mm. at 10 mm. from beak in central part of disc; concentric lines asymmetrical in profile, somewhat more distinct, more elevated and more slender at antero- and postero-dorsal sides than on central part of disc. Pallial sinus somewhat sloping upwards, rather large, medium

* abbreviation for Saito Ho-on Kai Museum, Sendai.

in depth, oblong-triangular in shape, pointed at end; adductor muscle scars slightly impressed, oblong in shape; anterior one somewhat smaller than posterior. Anterior lateral tooth of left valve rather large, somewhat elevated; median cardinal teeth strong and broad; posterior cardinal tooth rather low and slender.

Dimensions (in mm.):—

Height	Length	Depth	Ds/L	L1/L
32*	32	10.5	—	0.156
32.5	31.5	—	0.59	—
31**	31.5	—	0.6	0.15
—	35	12.5	—	—
30.5**	32	10	—	0.15
33	33.5	9.5	—	—
32.5	33	11	—	—

* Holotype. ** Specimens from the Kurosedani formation, Toyama Prefecture.

Remarks:—Though the present species is usually small in size, one moderate sized specimen (about 43 mm. in length) was found among the paratype specimens.

The present species is characterized by its small, rather greatly inflated, orbicular shell with numerous concentric growth lines, broad, triangular pallial sinus pointed at end and rather large anterior lateral tooth of the left valve.

This species resembles *Dosinia chikuzenensis* NAGAO from the Oligocene Ashiya group of Northern Kyushu (NAGAO, 1928) and *Dosinia suketoensis* OTUKA from the Miocene Shobara formation in Hiroshima Prefecture (OTUKA, 1938b), but it can be distinguished from the former by its smaller, more inflated shell, small and oblong lunule and the shape of pallial sinus, and from the latter by the position of beak, obscurely defined escutcheon and the shape of pallial sinus. Another related species is *Dosinia gruneri* (PHILIPPI) (REEVE, 1851), a Recent species of the China Sea, but *gruneri* is distinguishable from the present one by its moderately inflated shell, distinctly defined escutcheon, small anterior lateral tooth and the shape of pallial sinus which is roundly pointed at end.

Type locality, Geological formation and Age:—Path on the southern side of the valley Wakinosawa, about 2 km. west of Hitotsumori, Ajigasawa-machi, Nishi-Tsugaru-gun, Aomori Prefecture (Lat. 40°41′N., Long. 140°08′05″E.). Tanosawa formation. Early Miocene.

Described specimens:—Holotype and paratype specimens.

Distribution:—Tanosawa and Ainaigawa formations, Aomori Prefecture; Kurosedani formation, Toyama Prefecture; Yanagawa formation, Fukushima Prefecture; Shiratori member of Kadonosawa formation, Iwate Prefecture; all Early Miocene in age.

Associated fauna:—*Pedalion tugaruense* NOMURA, *Ostrea gravitesta* YOKOYAMA, "*Patinopecten*" (*Kotorapecten*) *iwasakiensis* (NOMURA), etc. at the type locality.

Subgenus *Phacosoma* JUKES-BROWNE, 1912

Dosinia (*Phacosoma*) *tugaruana* NOMURA, 1935

Pl. 6, figs. 8, 9, 10a-b.

1935. *Dosinia tugaruana* NOMURA, *Saito Hoon Kai Mus., Res. Bull., No. 5*, p. 58, pl. 6, fig. 6.

1935. *Dosinia odosensis* NOMURA, *Ibid.*, p. 59, pl. 7, fig. 2 (?).

1961. *Dosinia tugaruana*, IWAI, *Trans. Proc. Palaeont. Soc. Japan, N.S., No. 41*, pl. 1, fig. 4.

1961. *Dosinia odosensis*, IWAI, *Ibid.*, pl. 1, fig. 11.

1961. *Dosinia chikuzenensis*, IWAI, *Ibid.*, pl. 1, fig. 8 (non NAGAO, 1928).

Holotype:—SM, Reg. No. 6024.

Description:—Shell medium to small in size, moderate in convexity; suborbicular in outline, somewhat longer than high. Anterior side rounded, passing gradually into broadly rounded ventral margin; antero-dorsal side rather short, somewhat concave in front of beak; postero-dorsal side long, broadly rounded, passing somewhat abruptly into ventral margin. Beak pointed, curved forward, situated anteriorly at about 2/3 of shell length; lunule rather deeply impressed, rather long, cordate in shape; escutcheon linear, depressed, defined by somewhat distinct ridge. Surface sculptured with close-set, low, lamellated, fine concentric growth lines, about 30 per 10 mm. at 10 mm. from beak in central part of disc; concentric lines asymmetrical in profile, broader than their interspaces, more distinct, more elevated and more slender than those of central part of disc at antero- and postero-dorsal sides. Pallial sinus somewhat sloping upwards, rather large, medium in depth, oblong triangular in shape, bluntly pointed at end; adductor muscle scars somewhat impressed; anterior scar somewhat smaller than posterior one. Characters of hinge area unknown.

Dimensions (in mm.):—

Height	Length	Depth	Ds/L	L1/L
41	43	—	0.47	0.18
ca. 45*	47	—	0.44	—
—	44.5	11.5	—	0.18
—	32.5	—	0.45	—
42	44	ca. 12	—	—
37	38	—	0.43	—

* Holotype.

Remarks:—Since this species was described by NOMURA based upon one inner mold which lacks its anterior side, its detailed morphological characters remained unknown. *Dosinia odosensis* which was described from the same formation with *tugaruana* by NOMURA at the same time based upon an imperfect specimen retaining a little shell material may be a synonym of *tugaruana* with query. This procedure can be accepted from the relationships between the mold specimen and the specimen with shell materials as already stated in the earlier pages; the characters of *odosensis* appear to correspond with those of *tugaruana*. Though it is considered that further study is necessary to settle this problem, the writer considers that *odosensis* is a synonym of *tugaruana*.

The above mentioned description was based upon a plaster-cast specimen lacking the ventral part and collected from the Tanosawa formation at Ôdose, Fukaura-machi, with other dosinid specimens.

Dosinia nomurai OTUKA (1934) described from the Shiratori member of the Kadonosawa formation in Iwate Prefecture is closely related with the present one but it can be distinguished by its lower shell, rather protruded anterior part and short lunule (L1/L, 0.15-0.16). *Dosinia anguloides* NOMURA (1935b) from the Ajiri formation in Shiogama City, Miyagi Prefecture, which was described based upon a mold specimen, is distinguishable from the present species by its larger and higher shell and narrow and deep pallial sinus which is rounded at end.

Type locality, Geological formation and Age:—Hotatezawa, about 3 km. northwest of the Shinyu hot-spring, a tributary of the Sasanai River, Iwasaki-mura, Nishi-Tsugaru-gun, Aomori Prefecture (Lat. 40°35′N., Long. 140°01′E.). Tano-

sawa formation. Early Miocene.

Described specimens:—IGPS*, coll. cat. no. 37060. Ôdose, Tanosawa, Fukaura-machi, Nishi-Tsugaru-gun, Aomori Prefecture. Tanosawa formation.

Distribution:—Tanosawa and Ainai-gawa formations, Aomori Prefecture; Kawai formation (?), Shimane Prefecture: all Early Miocene in age.

Associated fauna:—*Chlamys akitana* (YOKOYAMA), "*Patinopecten*" (*Kotorapecten*) *iwasakiensis* (NOMURA), *Glycymeris* sp., etc. at the type locality; *Ostrea* cf. *gravitesta* YOKOYAMA, *Operculina complanata japonica* HANZAWA, *Miogypsina kotoi* HANZAWA, etc. at Ôdose, Fukaura-machi.

Dosinia (*Phacosoma*) *hataii*

MASUDA, n. sp.

Pl. 6, figs. 1a-c, 2.

1926. *Dosinia troscheli*, YOKOYAMA, *Jour. Fac. Sci., Imp. Univ. Tokyo, Sec. 2, Vol. 1, Pt. 4*, p. 133, pl. 16, fig. 1 (non LISCHKE, 1873).

1936. *Dosinia odosensis*, NOMURA and HATAI, *Saito Ho-on Kai Mus., Res. Bull., No. 10*, p. 128, pl. 14, fig. 1 (non NOMURA, 1935).

Holotype:—IGPS, coll. cat. no. 72476.

Description:—Shell large, thick, moderately inflated, suborbicular in outline, nearly as long as high. Anterior side rounded, passing gradually into broadly rounded ventral margin; antero-dorsal side short, somewhat concave in front of beak; postero-dorsal side broadly rounded, passing somewhat abruptly into ventral margin and forming a broad angle with postero-ventral margin. Beak pointed, separated from beak of other valve by deep hollow, somewhat curved forward, situated anteriorly at about 3/4 of shell length; lunule cordate in shape, rather large, deeply impressed; escutcheon narrowly elongated, somewhat depressed, defined by not very distinct ridge. Surface sculptured with low, close-set, lamellated, rather irregular concentric growth lines which about 22 per 10 mm. at 10 mm. from beak in central part of disc; surface slightly undulated from beak to ventral margin which may indicate resting stages of growth; concentric lines at posterior side somewhat distinct, elevated and slender compared with those at other places of disc. Pallial sinus slightly sloping upwards, rather narrow and small, medium in depth, reach to about central part of disc, somewhat roundly pointed at end. Adductor muscle scars large, oblong, distinctly defined, nearly equal in size. In left valve anterior lateral tooth rather small and low; median cardinal teeth rather slender and elevated; posterior cardinal tooth elongated and slender.

Dimensions (*in mm.*):—

Height	Length	Depth	Ds/L	L1/L
64*	66	19.5	0.55	0.15
56.5	57	17.5	—	0.15
56	59	18	—	0.15
60	62	—	0.5	—
61	—	18	—	—
53	54	15	—	—
46	50	—	—	—

* Holotype.

Remarks:—This new species was first illustrated by YOKOYAMA (1926) from the Miocene Kanomatazawa formation in Tochigi Prefecture as *Dosinia troscheli* LISCHKE and subsequently by NOMURA and HATAI (1936) from the Miocene

* abbreviation for Institute of Geology and Paleontology, Faculty of Science, Tohoku University, Sendai.

Tanagura formation in Fukushima Prefecture as *Dosinia odosensis* NOMURA. As the results of comparative study it is evident that the specimens of YOKOYAMA and NOMURA and HATAI represent a new form of *Dosinia*. Therefore, a new name is proposed for the Tanagura and Kanomatazawa specimens.

The present new species is named in honor of Professor Kotora HATAI of the Tohoku University.

The shell at the younger stage of the present new species possesses a longer shell but tends to become orbicular with growth. *Hataii* is characterized by its large, orbicular, thick shell, distinct large lunule and rather shallow, narrow pallial sinus being bluntly pointed at end.

This is distinguishable from *Dosinia tugaruana* (=*odosensis*) by its large, thick, orbicular shell, broad angle between postero-dorsal and ventral sides and shape of pallial sinus which is small and narrow. *Dosinia anguloides* NOMURA (1935b) also resembles the present one but *anguloides* can be distinguished from the present one by its small, less inflated shell, less protruded anterior dorsal side and deep pallial sinus which is rounded at end.

Type locality, Geological formation and Age:—Hattomaki, Hanawa-machi, Higashi-Shirakawa-gun, Fukushima Prefecture (Lat. 36°58′45″N., Long. 140°25′10″ E.). Kubota formation. Middle Miocene.

Distribution:—Kubota formation, Fukushima Prefecture; Kanomatazawa formation, Tochigi Prefecture; Yamatsuda formation, Iwate Prefecture: all Middle Miocene in age.

Associated fauna:—*Chlamys* (*Mimachlamys*) *kaneharai* (YOKOYAMA), "*Patinopecten*" *paraplebejus* (NOMURA and HATAI), *Miyagipecten matsumoriensis* MASUDA, *Dosinia* (*Kaneharaia*) *kaneharai* YOKOYAMA, *Trachycardium shiobarense* (YOKOYAMA), etc.

Subgenus *Kaneharaia* MAKIYAMA, 1936

Dosinia (*Kaneharaia*) *kannoi* MASUDA, n. sp.

Pl. 6, figs. 6a-b, 7a-b.

1936. *Dosinia* (*Kaneharaia*) *kaneharai*, MAKIYAMA, *Mem. Coll. Sci., Kyoto Imp. Univ., Ser. B, Vol. 11, No. 4, Art. 8*, p. 214, pl. 4, fig. 2.

1936. *Dosinia kaneharai*, NOMURA and ZINBO, *Saito Ho-on Kai Mus., Res. Bull., No. 10*, p. 339, pl. 20, fig. 1.

1936. *Dosinia kaneharai*, OTUKA, *Bull. Earthq. Res. Inst., Imp. Univ. Tokyo, Vol. 14, Pt. 3*, p. 443, pl. 30, fig. 3.

1940. *Dosinia kaneharai*, NOMURA, *Sci. Rep., Tohoku Imp. Univ., Ser. 2, Vol. 21, No. 1*, p. 26, pl. 1, figs. 15, 16.

1960. *Dosinia* (*Kaneharaia*) *kaneharai*, KANNO, *Japan Soc. Promot. Sci.*, p. 272, pl. 40, fig. 9.

1961. *Dosinia* (*Kaneharaia*) *kaneharai*, IWAI, *Trans. Proc. Palaeont. Soc. Japan, N.S., No. 41*, pl. 1, fig. 1.

Holotype:—IGPS, coll. cat. no. 64682.

Description:—Shell medium, moderate in thickness and convexity, suborbicular in outline, nearly as high as long. Anterior side moderately rounded, passing gradually into broadly rounded ventral margin; antero-dorsal side slightly concave in front of beak; postero-dorsal side broadly rounded, passing gradually into ventral margin. Beak pointed, curved forward, situated anteriorly at about 3/4 of shell length; lunule shallow, elongate cordate in shape, rather obscurely defined; escutcheon not observed. Surface sculptured with low, rather regular, broad, somewhat rounded concentric growth lines and sometimes with interstitial lines which are more slender than concentric lines; concentric lines

about 11 per 10 mm. at 10 mm. from beak in central part of disc and separated by shallow grooves which are much narrower than concentric lines; concentric lines at antero- and postero-dorsal sides, especially at posterior side, more elevated, more rounded and more slender than those of central part of disc, nearly equal to their interspaces; concentric lines near ventral margin usually tend to become numerous, slender and low; interstitial lines usually appear near antero- and postero-dorsal sides and tend to become stout towards central part of disc. Pallial sinus slightly sloping upwards, broad, rather shallow, nearly triangular in shape, rounded at end. Adductor muscle scars obscurely defined, large, oblong; posterior one somewhat larger than anterior one. Hinge very broad; anterior lateral tooth of left valve small, rather low; median cardinal teeth distinctly elevated; posterior one somewhat elevated, slender; rather deep and oblong pit at upper end of posterior lateral socket distinctly defined.

Dimensions (in mm.):—

Height	Length	Depth	Ds/L
54.5*	55	17.5	0.34
45.5	—	15	—
57.5	59	17	—
53	—	15.5	—
45	47	13	0.34

* Holotype.

Remarks:—This new species is named in honor of Dr. Saburo KANNO of the Geological and Mineralogical Institute, Tokyo University of Education.

The present species is usually medium in shell size but very rarely large ones are found. This species is characterized by its medium-sized shell, rather regular, rounded, broad concentric growth lines, obscurely defined lunule, no escutcheon, broad, shallow pallial sinus which rounded at end, and distinct, rather deep pit at the end of posterior lateral socket.

Dosinia (Kaneharaia) kaneharai (YOKOYAMA) (1926) is much related with the present one and the latter has hitherto been included into the former. However, the present one can be distinguished from *kaneharai* by its smaller shell, regular concentric growth lines and broad pallial sinus which is rounded at end.

The present species occurs from a horizon lower than that of *kaneharai* and the former differs from *kaneharai* in the surface sculptures as mentioned above. The concentric growth lines of *kannoi* are rather regular except for those near the ventral margin but those of the latter are usually irregular except for at the upper part of disc. The surface sculpture of the adult forms of *kannoi* takes the sculpture of the younger forms of *kaneharai*. Therefore, the writer is inclined to consider that *kannoi* is ancestral to *kaneharai*. This may be supported from the relation between the geological horizon and the size of shell, that is to say, the older the geological age (horizon), the smaller the size of the shells.

Type locality, Geological formation and Age:—Kinseidô, Kinshôdô, Eihoku-men, Kisshu-gun, Kankyô-hokudo, North Korea. Heiroku formation. Early Miocene.

Distribution:—Heiroku formation, Korea; Yanagawa formation, Fukushima Prefecture; Moniwa member of the Hatatate formation, Miyagi Prefecture; Sugota formation, Akita Prefecture; Saginosu formation, Saitama Prefecture; Ainaigawa formation, Aomori Prefecture; all Early Miocene in age.

Associated fauna:—*Anadara ogawai*

(MAKIYAMA), *Glycymeris cisshuensis* MAKIYAMA, *Chlamys* (*Mimachlamys*) *meisensis* (MAKIYAMA), *Pitar itoi* MAKIYAMA, etc. at the type locality.

Remarks

Considering from the above mentioned geographical distribution, geological range and associated fauna of the fossil species described in the present article, *Dosinia akaisiana* NOMURA, *Dosinia* (*Phacosoma*) *tugaruana* NOMURA and *Dosinia* (*Kaneharaia*) *kannoi* MASUDA are considered to be representatives of the lower horizon of the Japanese Miocene and while *Dosinia* (*Phacosoma*) *hataii* MASUDA of a horizon higher than that of the former species. Furthermore, it is considered that the horizon of *Dosinia akaisiana*, *Dosinia* (*Phacosoma*) *tugaruana* and *Dosinia* (*Kaneharaia*) *kannoi* may correspond to the *Nanaochlamys notoensis* assemblage (Early Miocene) and that of *Dosinia* (*Phacosoma*) *hataii* to the *Miyagipecten matsumoriensis* assemblage (Middle Miocene) in Central to Northern Japan (MASUDA, 1962). This view may be supported by the evolutionary trend of *Dosinia* (*Kaneharaia*) *kannoi* and *Dosinia* (*Kaneharaia*) *kaneharai*.

Dosinia matumotoi OTUKA (1938a, p. 11, pl. 1, fig. 10) was described from the Miocene Shiroyama formation at Kanbara-machi, Ihara-gun, Shizuoka Prefecture based upon an imperfect specimen. However, according to the writer's study of the type specimen (Geological Institute, Faculty of Science, Tokyo University, Reg. No. 3992) it is evident that *Dosinia matumotoi* can not be included into the genus *Dosinia*, because it should be placed in the genus *Lucinoma* and may be identified to *Lucinoma acutilineatum* (CONRAD).

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Explanation of Plate 6

(All figures in natural size unless otherwise stated)

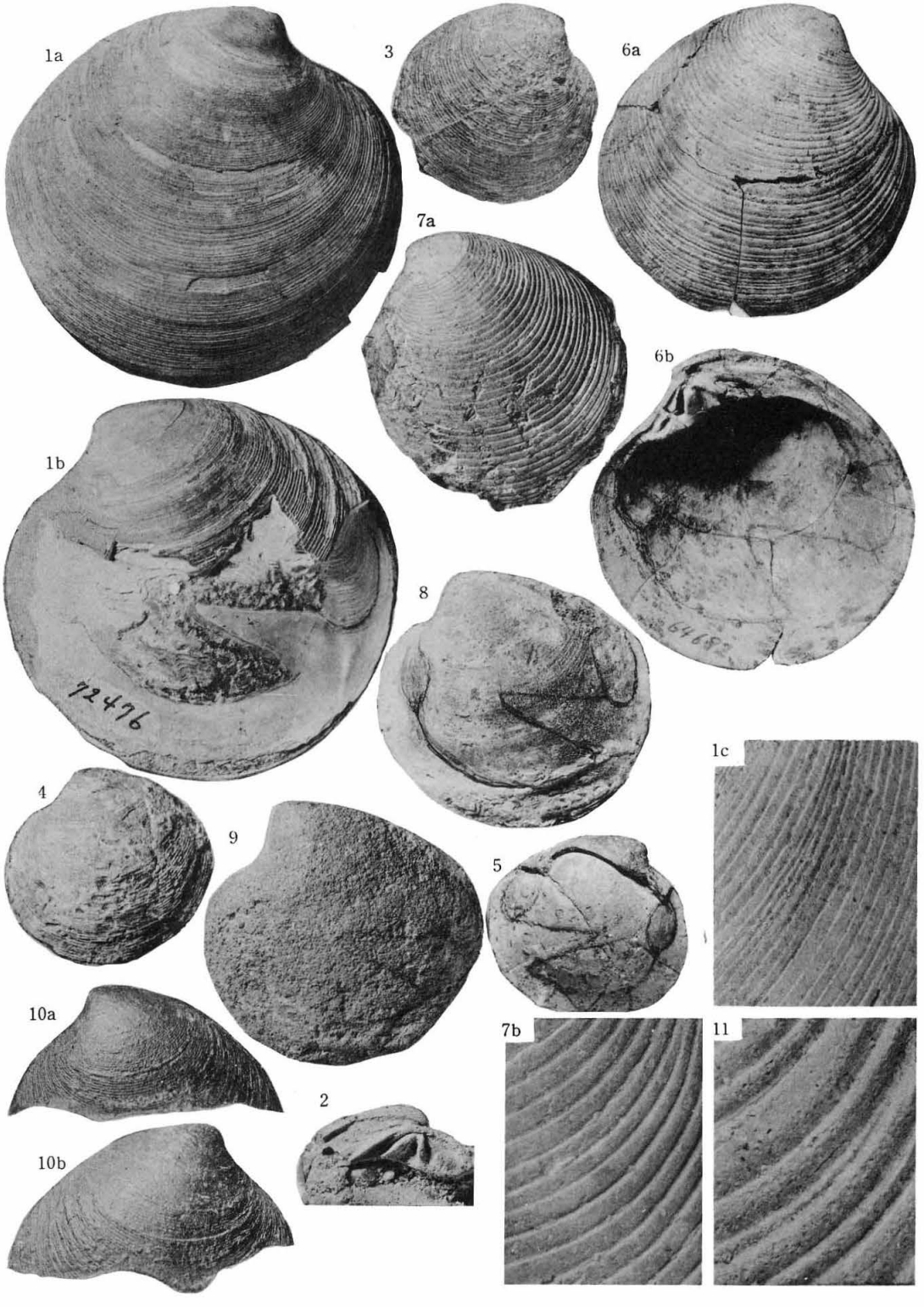
Figs. 1a-c, 2. *Dosinia* (*Phacosoma*) *hataii* MASUDA, n. sp.
1a, Right valve. b, Left valve. c, A part of the outer surface of 1a, ×ca. 3. Holotype, IGPS, coll. cat. no. 72476. Loc. Hattomaki, Hanawa-machi, Higashi-Shirakawa-gun, Fukushima Prefecture. Kubota formation.
2, Hinge area of left valve. IGPS, coll. cat. no. 2645. Loc. Okada, Tanagura-machi, Higashi-Shirakawa-gun, Fukushima Prefecture. Kubota formation.

Figs. 3-5. *Dosinia akaisiana* NOMURA.
3, Right valve. Holotype, SM, Reg. No. 6061. 4, Left valve. 5, Right valve. Paratype, SM, Reg. No. 6061. Loc. Hitotsumori, Ajigasawa-machi, Nishi-Tsugaru-gun, Aomori Prefecture. Tanosawa formation.

Figs. 6a-b, 7a-b. *Dosinia* (*Kaneharaia*) *kanmoi* MASUDA, n. sp.
6a, Right valve. 6b, Inner surface of 6a. Holotype, IGPS, coll. cat. no. 64682. Loc. Kinseidô, Kinshôdô, Eihoku-men, Kisshu-gun Kankyô-hokudô, Korea. Heiroku formation. 7a, Left valve. 7b, a part of the outer surface of 7a, ×ca. 3. Paratype, IGPS, coll. cat. no. 64755. Loc. Same as above.

Figs. 8-10a-b. *Dosinia* (*Phacosoma*) *tugaruana* NOMURA.
8, Inner mold of left valve. Holotype of "*Dosinia odosensis* NOMURA". SM, Reg. No. 6020. Loc. Ôdose, Fukaura-machi, Nishi-Tsugaru-gun, Aomori Prefecture. Tanosawa formation. 9, Inner mold of left valve. Holotype, SM, Reg. No. 6024. Loc. Hotatezawa, Iwasaki-mura, Nishi-Tsugaru-gun, Aomori Prefecture. Tanosawa formation. 10a, Plaster-cast of left valve. 10b, Plaster-cast of right valve. IGPS, coll. cat. no. 37060. Loc. Same as fig. 8.

Fig. 11. *Dosinia* (*Kaneharaia*) *kaneharai* YOKOYAMA.
A part of outer surface, ×ca. 3. SM, Reg. No. 2644. Loc. Same as Fig. 2.



MASUDA photo.

PROCEEDINGS OF THE PALAEONTOLOGICAL SOCIETY OF JAPAN

日本古生物学会第83回例会は1962年12月1日広島市東千田町広島大学理学部地質学鉱学教室において開催された（参会者31名）。

個人講演

The Paleontologic and Stratigraphic Considerations on the Neoschwagerininae and Verbeekininae, with the Descriptions of Some Fusulinid Foraminifera from the Kitakami Massif .....Shoshiro HANZAWA and Masabumi MURATA

Permian Brachiopods from Central Thailand.....Juichi YANAGIDA

Halobia and some other Fossils from Kedah, Malaya (代読) .....Teiichi KOBAYASHI

On the Cretaceous Ban Na Yo Fauna of East Thailand with a Note on the Distribution of *Nippononaia*, *Trigonioides* and *Plicatounio* (代読) ....Teiichi KOBAYASHI

On some Lower Cretaceous Trigonids from Central Japan (代読) .....Shiro MAEDA

Glycymeris and *Cultellus* from the Tertiary Hioki (Ashiya) Group in the Yuya-wan, Yamaguchi Prefecture .....
..Kazuo OKAMOTO and Mitsuo NAKANO

Pseudamiantis について (代読).....岩崎泰穎

Two Species of *Tainoceras* from the Permian of the Kitakami Mountains .....
.....Ichiro HAYASAKA

篠山層群産の化石カイエビ類について....楠見 久

シンポジウム「中国地方を中心とした古生界の対比に関する問題」

中国地方石炭紀石灰岩の小型有孔虫化石群の特性.....沖村雄二

Upper Lower Carboniferous Brachiopods from Akiyoshi.....J. YANAGIDA

中国地方西部の非変成古生層の対比について ..
.....河野通弘

岡山県阿哲石灰岩の紡錘虫にもとづく化石層序について.....佐田公好

Triticites 帯について .. ..鹿沼茂三郎

霊仙山とその付近（岐阜，滋賀県）の *Pseudoschwagerina* 帯について .....小池敏夫

舞鶴層群の層序と化石群ーとくに腕足類化石群について.....清水大吉郎

On some Permian Macrofossils from Hiroshima Prefecture, Japan .....
..... I. HAYASAKA and I. NISHIKAWA

日本古生物学会昭和37年度年会は，1962年1月19，20日東京大学理学部地質学教室において開催された（参会者46人）。

特別講演

タイ国古生物調査について....小林貞一，橋本 亘

個人講演

Fusulinids from the Ardomore Limestone Missouri .....Hisayoshi IGO

Pseudocibicidoides 属（有孔虫）のタイプについて.....青木直昭

Two Carboniferous Brachiopods from Loei, Thailand .....Takashi HAMADA

On the Triassic *Daonella* Beds in Central Pahang, Malaya .....Teiichi KOBAYASHI

Preliminary Report on the Lower Cretaceous Marine Pelecypods in Japan.....
.....Itaru HAYAMI

Note on Two New Genera of Heterodont Bivalves from the Late Cretaceous Izumi Group.....Koichiro ICHIKAWA

Late Cretaceous Pelecypods from the Izumi Group. Part III. Order Heterodontida (1) .....
..Koichiro ICHIKAWA and Yasuo MAEDA

Portlandia tokunagai and its Associated Fauna in Japan .....Saburo KANNO
Miocene Mollusca from Tomikusa District, Nagano Prefecture. Pt. I. Taxodonta.. ..... Masae OMORI and Keiji MIYAJIMA
Tertiary Mollusca from Tagoegawa Formation—with special Reference to *Perotrochus* Transgression in Kwanto District —.....Masae OMORI
いわゆる大桑万願寺型動物群と龍の口型動物群との関係について.....鎮西清高
本邦産いわゆる *Patinopecten* 属について.....増田孝一郎
いわゆる *Bostrychoceras* について ....松本達郎
On some Carboniferous Ostracodes from Japan.....Kunihiro ISHIZAKI
再び北海道添牛内産ウニについて ....橋本 亘, 氏家 宏
The Hadrosaurian Dinosaur of Takashima, Kyushu, Japan .....Fuyuji TAKAI

古植物学シンポジウム

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国際花粉学会と我国の花粉学 .....徳永重元
米合衆国北西部諸州第三紀層の花粉分析とそれに関連する諸問題.....相馬寛吉

〔古植物と古気候〕
中生代の古植物と気候との関係 .....木村達明
古植物と気候との関係 .....遠藤誠道
討　　論　（シンポジムウの参会者 31 人）

学　会　紀　事

◎ 1962 年 1 月 1 日より 1962 年 12 月 31 日までの会員移動は次の通りである。

入会者：田代正之・R. W. MORRIS・辻 富夫・W. R. DANNER・太田正道・日高 稔・Takeo SUSUKI・R. D. HOARE・北条凱生・村本辰雄・大原 隆・前田保夫・宮島圭司・市村賢一・安藤保二

退会者：土田耕造・本間不二男（死亡）

◎ 本会誌の出版は一部文部省研究成果刊行費補助金による。

例　会　通　知

	開催地	開催日	講演申込締切日
第 84 回例会	東北大学	1963年6月1・2日	1963年5月1日
第 85 回例会	地質調査所（川崎）	1963年9月7・8日	1963年7月31日
第 86 回例会	大阪市立大学 大阪市立自然科学博物館	1963年11月9・10日	1963年9月30日

本年6月1・2日東北大学で開催される本会第84回例会には「新第三紀」に関するシンポジウムが予定されている。

会　員　消　息

◎ 会員遠藤隆次君は古生物学への功績により紫授褒賞を授与された。
◎ 会長小林貞一君は第6期日本学術会議会員（第4部地質部門）に当選した。
◎ 会員石島渉君は3ヶ月にわたる欧米視察旅行をおえ昨年12月下旬帰国した。
◎ 会員猪郷久義君は米国イリノイ州立地質調査所の仕事をおえ昨年12月帰国した。

News

◎ 本会特別号第9号 (Palaeontological Society of Japan, Special Papers No. 9) として会員高井冬二君編 Bibliography of Japanese Palaeontology and Related Sciences 1951-1960 が出版されました。(定価 2,800 円)

◎ 本会邦文出版物「化石」も第4号まで出版されましたが今後は年2冊出版し下記の様に配布することとなりました。御購読下さい。

「化石」購読費（年2冊）会員 550 円　非会員 600 円

但し購読費は一年分御払下さい。1冊売りは1冊 350 円です。

◎ 会誌は原則として会員の住所に御送りすることになりました。住所・勤務先御変更の折は本会会員係まで御連絡下さい。

購読御希望の方は本会宛御申込下さい

1963年4月5日　印刷
1963年4月10日　発行

日本古生物学会報告・紀事
新篇第49号
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日本古生物学会会則　(1962, 1, 20)

第 1 条　本会は日本古生物学会という。

第 2 条　本会は古生物学およびこれに関係ある諸学科の進歩および普及を計るのを目的とする。

第 3 条　本会は第 2 条の目的を達するため次の事業を行う。

1. 会誌そのほかの出版物の発行。 2. 学術講演会の開催。
3. 普及のための採集会・講演会そのほかの開催。
4. 研究の援助・奨励および研究業績ならびに会務に対する功労の表彰その他第 2 条の目的達成に資すること。

第 4 条　本会の目的を達するため総会の議を経て本会に各種の研究委員会を置くことができる。

第 5 条　本会は古生物学およびこれに関係ある諸学科に興味を持つ会員で組織する。

第 6 条　会員を分けて普通会員・特別会員・賛助会員および名誉会員とする。

第 7 条　普通会員は所定の入会申込書を提出した者につき評議員会の議によって定める。

第 8 条　特別会員は本会に 10 年以上会員であり古生物学について業績のあるもので，特別会員 5 名の推薦のあったものにつき評議員会の議によって定める。

第 9 条　賛助会員は第 2 条の目的を賛助する法人で評議員会の推薦による。

第 10 条　名誉会員は古生物学について顕著な功績のある者につき評議員会が推薦し，総会の決議によって定める。

第 11 条　会員は第 12 条に定められた会費を納めなければならない。会員は会誌の配布を受け第 3 条に規定した事業に参加することができる。

第 12 条　会費の金額は総会に計って定める。会費は普通会員年 800 円，特別会員年 1,300 円，賛助会員年 10,000 円以上とする。名誉会員は会費納入の義務がない。在外の会員は年 5 弗とし会誌および特別出版物の配布を受ける。

第 13 条　本会の経費は会費・寄付金・補助金などによる。

第 14 条　会費を 1 ケ年以上滞納した者および本会の名誉を汚す行為のあった者は，評議員会の議を経て除名することができる。

第 15 条　本会の役員は会長 1 名，評議員 15 名とし，うち若干名を常務委員とする。任期は総て 2 年とし再選を妨げない。
会長の委嘱により本会に幹事および書記若干名を置くことができる。
常務委員は評議員会において互選される。評議員は特別会員の中から会員の通信選挙によって選出される。

第 16 条　会長は特別会員の中から評議員会において選出され，本会を代表し会務を管理する。
会長に事故ある場合は会長が臨時に代理を委嘱する。

第 17 条　本会には名誉会長を置くことができる。名誉会長は評議員会が推薦し総会の決議によつて定める。名誉会長は評議員会に参加することができる。

第 18 条　本会は毎年一回定例総会を開く。その議長には会長が当り本会運営の基本方針を決定する。
総会の議案は評議員会が決定する。
会長は必要があると認める時は臨時総会を召集する。総会は会員の十分の一以上の出席をもつて成立する。
会長は会員の三の分一以上の者が会議の目的たる事項および召集の理由を記載した書面をもつて総会召集の請求を受けた場合は臨時総会を召集する。

第 19 条　総会に出席しない会員は他の出席会員にその議決権の行使を委任することができる。但し，欠席会員の議決権の代行は 1 人 1 名に限る。

第 20 条　総会の議決は多数決により，可否同数の時は議長がこれを決める。

第 21 条　会長および評議員は評議員会を組織し，総会の決議による基本方針に従い運営要項を審議決定する。

第 22 条　常務委員は常務委員会を組織し評議員会の決議に基づいて会務を執行する。

第 23 条　本会の会計年度は毎年 1 月 1 日に始まり 12 月 31 日に終る。

第 24 条　本会会則を変更するには総会に付議し，その出席会員の三分の二以上の同意を得なければならない。

付　則　1) 評議員会の議決は総て無記名投票による。